SPECIAL—BUILD YOUR OWN HACKINTOSH

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Spotlight on New, Low Cost Power Computers

IBM Introduces Desktop PS/2 Model 70, Faster Model 50Z

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TABLE OF CONTENTS

SPECIAL—BUILD YOUR OWN HACKINTOSH COMPUTER

- Spotlight on New, Low Cost Power Computers
- IBM Introduces Desktop PS/2 Model 70, Faster Model 50Z
- Enter The Best Buy Sweepstakes

ARTICLES

Building The Hackintosh – the Computer For The Best Of Us 11
Low Cost PC Power Computers – *Is Bigger, Better* .. 12
The Information Age Problems And Solutions 45
Intersecting Concepts Announces VGA Enhancement Software 77
DigiBoard Has New Drivers For PS/2 Multi-User Boards 77
Lifeboat Releases Enhanced Version Of TimeSlicer . 77
Ventek Announces PS 2000 Monitor 77
Editorial – The Hackintosh Computer – Resurrection Not Cloning 113
Digital Research Launches DRDOS New PC/MSDOS Compatible Operating System 113
The Hard Stuff: Life With The LiteDrive 10 114
Award Software Introduces BIOS For NEAT CHIPset 114
Zenith Boosts Z-386 Standard Memory To Two Megabytes 119
Tandon 386 Micro Includes Data Pac Technology .. 121

FEEDBACK

A Letter From The Publisher/Editor-In-Chief 177

IBM-MSDOS

IBM Introduces New System/2 Desktop Models 181
IBM Personal System/2 Model 70 386 181
New IBM Desktop Publishing Enhancements 183
Interview With Dr. Kildall Of Digital Research, Inc. . 283
Power C: Powerful Programming At A Powerful Price 288
AdLib's Music System: Superior Electronic Sound .. 292
Another Perfect – Perfect Exchange 294
Popup Menus Make WordPerfect A Cinch! 298
Beyond.Bat 301
Program Maintenance: Touch And Make For MSDOS 302
What's New On The Boards? 309
SuperCalc4 Versus Lotus 1-2-3 Release 2.01 311
TurboCAD 316
Easy Working Writer 319
Celebrity: More Than A Word Processor 320
Garbage Bag Databases May Be Perfect Tools For Writers 323
Wordbench For Wordsmiths 325
Mindviewer "Know Thyself (And Anyone Else!)" ... 328
Enable – Integrated Software Package 330
New Transcopy Board Bridges Mac/IBM 333

APPLE

Ask The Guru 191
Applefest Boston Show Report 191
Zip Chip Arrives 192

MACINTOSH

MacUniverse 197
DataDesk Keyboards 197
Macintosh Compatibility For HP ScanJet Desktop Scanner 198
New Line Of Casino Games For The Mac 198
Laserwriter Corner 199

AMIGA

The Amiga Workbench 205
Excellence 205
The Director 206
BeckerText Amiga – Integrates Word Processing And Graphics 206
Beyond Zork And Sherlock – The Riddle Of The Crown Jewels 356
Photon Paint HAM And All The Trimmings 358
Aegis Ship Video Titler Update 360

ATARI ST

More On Multi-Tasking 213
The Atari ST – The Story So Far 213
Quantum Paint-4096 Colors For Atari ST 214
Atari To Release Fourth Edition Of TOS 214
ST Game Pick Of The Month 368

COMPUTER BOOKS

Popular Computer Book List 221
Introduction To Writing Programs For The Apple IIgs 221
Book Review 222

CLASSIC COMPUTERS

COMMODORE

GeoSynch: RAM Expanders, Word Publisher & Interface Philosophy 229
Historical Simulations – The Past According To Accolade 379
Getting The Most From Your C-128! 384
Catching Up With FOG Activities 386
SupraModem 2400 – Affordable High Speed Telecommunications 389
CP/M Column 390
CP/M Column Update 396
Brooklyn Bridge Adds New Utilities 397

TIMEX SINCLAIR

Sinclair Survival Column 229
The Z88 Personal Computer 472

TANDY

The CoCo Column 230

TEXAS INSTRUMENTS

TI Forum 230
Tour de Forth 465

ATARI

Applying The Atari 232
New Software For The 8-Bit Atari 467
Note And Point – Atari 8-Bit News And Comment 469

ADAM

The ADAM Forum 232

UNIX

Unix And New Wave Jazz 234

MISCELLANEOUS

MIDI Column 245
PostScript Error Trapping And Reporting 245
Computercrostic #4 246
Chintzy Computer Covers 246
Computer Printer Cart 247
From Concept To Design...With The Kontron Graphics Controller 252
Text Files Become Gurus At Users' Elbow 466
NEC Enters CD ROM Market 475
More Operating Systems 482
The Acer 1100: A 386 In A Class By Itself 483
Public Domain Software Can Be Downloaded Into A Bargain Laptop PC 491
Inexpensive Scanner Arrives For PCs And Clones .. 492
Canon's IX-12F Flat Bed Image Scanner 495
Kodak Gives 25% More Diskettes Free 495

COMPUTER STARTER

Ask Dr. John 254
Your BASIC Backpack 254
Write Pre-Boot Messages To Screen 260
Upgrading To MSDOS 3.3 261
Artificial Intelligence Shareware Gives Your PC Some Smarts 497
Danish, Norwegian And Portuguese Spelling Verifiers/Correctors 500
EasyNet Introduces Low Cost LANs 501

C*SIX – NOTES

Networking 412
Telecomputing: BBS Of The Month 412
Opus Is Still Free 421

OTHER

Showcase .... 398, 400, 402, 404 & 406
Bulletin Board 413, 414, 415, 416, 417
.... 418, 419, 420, 421 & 431
Users Groups .... 425, 426, 427, 428, 429, 430 & 431
Coming Events .... 408 & 409
Classifieds 440
Advertiser Index 516
Service Directory 455

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CONTRIBUTORS
Dr. Ron Albright, Lon Andrews
Jeff Brenner, Phillip Chien
Don Lancaster, Cheryl Peterson
Mark Fendrick, Ervin Bobo
Ronald Bobo, Andrew Fried
Johnathan Zittrain, Peter Ruber,
Barbara & John McMullen
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ATARI ST

More On Multi-Tasking

Editors Note: D.F. Scott gave his definition of Multi-tasking in one of his columns and then answered critics in a follow-up column. This entire discussion has created a tempest-in-a-teacup with a flood of letters, pro and con. I have selected an article by Wynn Rostek which explains the computer scientist's view of the subject. Wynn Rostek holds a B.S. in Computer Science. He is currently employed by Lockheed at Kennedy Space Center. He was also one of the first communication software developers for the Atari ST.

Clearing The Air

by Wynn A. Rostek

There seems to be more than a little confusion surrounding several topics that have been discussed in the ST section as of late. I think that the time has come that I should attempt to shed a little light on things so that we can get on with more important matters.

I may not be a world class expert, but I suspect I am more knowledgeable than the parties that have been discussing it to date.

The short explanation of multi-tasking is 2 or more arbitrary user processes sharing system resources (CPU, memory, etc.) in a non-serial manner. In this context, non-serial has a very special meaning. A few simple examples should help here.

Let's take the simplest case where we have two programs we need to run, and only a single computer to run them on. Let's call the programs A and B. Our computer, like most computers has just a single CPU.

Your first option is to run program A and as soon as it is done, run program B. You can also run program B and then run program A when B is done. Both of these options are serial execution. One program starts running, and runs to completion before the second program even starts execution. This is Not! multi-tasking. (Excuse my improper English, but I needed to make a point.)

Let's look at a typical multi-tasking execution of programs A and B. First we start up program A, and it gets the CPU for a while. We then start up program B. The CPU then spends the next few minutes switching between program A and program B. The CPU might run A for one tenth of a second (100 milliseconds) and then it runs program B for 100 milliseconds.

Please note that only one of the two programs is ever "running" at a time. By this I mean that at any given instant, the CPU is executing code from only one of the programs. If the CPU switches between A and B quickly enough, it gives the illusion that both programs are running at the same time. It is more technically correct to state that both programs "progress" because only one "runs" at a time.

By now, I'm sure several DOS fans are saying, "Wait a minute, I can print a file and at the same time I can edit another file. Isn't that multi-tasking?" No it isn't. The magic word here is arbitrary.

By arbitrary I mean any process the computer can run, not just special programs like as print spooler, terminate and stay resident (tsr) programs or an interrupt routine. If you can pick any two programs that the system can normally run, and you can have both of them "in progress" at the same time, then it's multi-tasking.

"What's the difference between a program and a process?" I'm glad you asked. A program is a set of instructions to perform a job in a finite period of time. A process is a task (often called a job by old timers) that has already started. We need to distinguish between programs and processes because on a large system with a lot of users, several people may be running the same program.

Think of a large computer with 100 students toiling away at 100 terminals, trying to finish their programming 101 assignment. What are the chances that 2 or more students are running the editor? It's almost a sure bet that most of the students are using the editor!

In this case, we have one program (the editor) but many, many processes. A process is any job "progressing," so Bob and Ed may both have the editor "progressing," but each of them would have a unique process.

If I was the evil system administrator, I could delete Bob's job from the system. This would not effect Ed at all. Just because Bob's process left the system doesn't mean Ed is in trouble. Ed's process is still in the computer and it is still progressing.

Please note that I have made no mention what the programs are doing, whether they share data, or perform related jobs, or whether they swap space or share code. All of these things are items of concern when we discuss operating systems, but they don't have a thing in the world to do with multi-tasking!

Addressing a few specific points, I'd like to site words that appeared in D.F.

continued on page 215

The Atari ST—The Story So Far

by D. F. Scott

Many of us who prefer to use STs on a regular basis view computing as an honorable skill rather than a deplorable tedium. We purchased our machine not because it ran some particular million-selling program we were told we had to use. Contrary to what many writers believe, not all of us bought our STs out of loyalty to Atari. We, for the most part, like the way the ST works. Whenever we've spent too much time listing the ST's internal bugs, or generating a wish list for future enhancements to TOS (The Operating System) we remember the turmoil which PC users are put through regularly—updating their AUTOEXEC batch files, re- CONFIGuring their systems, sorting their sub-directories—and we breathe a sigh of respect for our humble grey slab of technology.

Atari has perhaps done more to influence the computing industry—indirectly—than you might think. In the mid '70s, after Nolan Bushnell's Atari first discussed how home computers would actually work, Steven Jobs left Atari, taking some of his ideas—and Steve Wozniak—with him into the garage that became Apple Computer.

The ST, born in 1985, was one of the first things Atari had done for Atari in several years. It was born out of a back-burner project at Commodore started in the late '70s, code-named GHU (God Help Us), and spearheaded by a visionary named Shiraz Shivji. When CBM President Jack Tramiel left, he took his son Sam and designer Shivji along with him, and set up a company called Tramiel Technologies Ltd. in 1984. By September of the very next year, just months after Tramiel assumed Atari's debts from Warner Communications, the 520ST was made available to consumers. The "G" in GHU was apparently on Atari's side.

"TTL," ironically, also stands for the architecture of many of the chips used on the ST's motherboard— transistor-to-transistor logic. Shivji's design called for simple, affordable, accepted hardware to keep production costs down. The ST's operating system was planned to attract PC developers by giving them a familiar programming environment—one which was conceived by the originators of CP/M.

The Politics Of GEM

To understand just why GEM on the ST is the way it is, an historical description of operating system methodologies is in order. The division of labor in TOS is like the organization of political parties in a European government; the older conservative factions (BIOS/-XBIOS/GEMDOS) retain their solid majority in the hexadecimal parliament, and the minority labor party (VDI/AES) is always the most vocal, most utilized, and most subject to flexibility in its platform or purpose. Then there is the occasional "Green Party" or "Arbor Party" whose ST parallels will be recognizable later in this discussion.

In 1981, it appeared the PC computing world would have its choice of two major microcomputer operating systems—Microsoft's MSDOS and Digital Research's CP/M. The differences in user operation of both systems are noticeable and concrete. MSDOS retains a dynamic user command library; the system literally doesn't know what its library commands are until a user request typed on its command line corresponds with one of the COM files in the root directory of its main disk. Every time you "turn on" MSDOS, your boot disk in effect teaches it what it's supposed to be doing.

CP/M operates with a different flavor. Instead of reading parametered commands all scrunched together on one line, it offered the user miniature utility programs, such as SETUP. The user would call a CP/M utility just by typing its name. CP/M utilities would continually prompt the user for input, often displaying the available selections in full and recognizable English. Later in their development (here's the key point) they utilized menu boxes with highlighted selections chosen with cursor keys. Digital Research—which later produced GEM—had been in friendly communication with Xerox's Palo Alto Research Center, the chief research laboratory for graphic operating concepts in computing.

GEM was designed to be a graphic toolbox for these applications, so programmers wouldn't have to waste their time drawing menu bars and icons manually. Had Microsoft not been as successful in marketing MSDOS, GEM probably would have been the graphic toolbox for CP/M. As it stands now, GEM still retains the Digital Research methodology carried over from CP/M,

continued on page 365

Quantum Paint-4096 Colors For Atari ST

by Gary S. Futral

In a recent ST exclusive magazine I read a rather lengthy article on Spectrum 512, a fairly new paint program designed to allow all 512 colors to be displayed. At the end of the article the author queried almost as if thinking aloud “why only 512 colors?” I smiled upon reading this because I had just purchased Quantum Paint from Eidersoft—the first software to deliver a palette of 4096 colors for the ST.

Before I had received it I really found this hard to believe. Now, after checking the package out, I can attest to the fact that their claim is correct. However, there are some drawbacks which I will point out.

At first glance, there is every appearance of a well designed and thought out program and instruction manual. The manual is a 3 ring binder with loose leaf pages. The printing is sharp and the instructions are clear and easy to follow. A README.DOC file is on disk to list qualifiers and any additional instructions.

Although the disk is not copy protected Eidersoft has opted for using the manual as the “key” to gaining access to the program. Upon booting up the program you will be requested to enter a word from the manual. It is essential that the manual always be at your side because Quantum Paint has yet to request the same word twice.

Quantum Paint has four graphic modes available to the user: 128 color mode (low res), 32 color mode (med res), 512 color mode (low res), and 4096 color mode (low res).

The terms “128” and “32 color mode” are a little misleading. The screen of each is divided into eight sections with each section having its own color palette of 16 (or 4 in med res). These sections can either be toggled on/off or varied in size.

Animation is possible in these two modes with the ability to store up to ten thousand frames via delta compression. Just the bare minimum of tools are supplied. No special “tweening” functions are available allowing only simple page flipping to be done. The animated sequence can be stored and played back with a slideshow program provided.

In 4096 and 512 mode the entire color range can be displayed with 25 different colors possible per scan line. Because much of the CPU’s time is needed to accomplish this feat, no animation is possible.

There are three screens with which to work. One is the drawing tool screen where, among other things, the animation feature is located. Next is the special function screen, and the final one is the picture itself.

The drawing tool screen is very straightforward, having icons to represent each drawing function. However, some desirable functions are missing. One can make a circle but no ellipse. Concentric circles and squares are not possible. Special effects functions are very limited. Although cut and paste is possible, flipping, rotating, stretching, and skewing are not. One can just about say Quantum Paint has about the same features as Neochrome Version 0.5 thus providing the user with the basic tools.

A zoom mode is available with only one magnification. This turns out to be the most-used feature of the program. One of the problems, however, is the difficulty in figuring out where one was when wanting to rezoom in on a nearby area.

One accomplishes palette manipulations on the drawing tool screen. In 128 and 32 color mode all 16 or 4 colors, respectively, are displayed here. Under the palette is a row of eight boxes that correspond to the eight sections of the picture screen. Double clicking a color causes the familiar slide bars to appear allowing one to adjust it. In 512 and 4096 mode only the control panel-like slide bars are displayed.

There are a few extras, though. Twelve drawing styluses are available with the user given the ability to customize eleven of them. Another feature is the ability to load and scale GEM fonts. Also, variable line thicknesses can be used as can a large number of predefined fill patterns.

The second screen—the special function screen—is where one loads, saves, deletes pictures and animation sequences. Specific drawing features can be toggled. Also, something called “update” can be tailored. This feature allows the user to delay the time for the drawing to be updated.

The third and last screen, which is somewhat odd, is the picture. In 512 or 4096 mode one takes a color from the drawing tool screen, but the color one lays down here may not be the intended color. As one draws, the program selects one of 16 colors to which the intended is closest. When Quantum Paint senses the mouse has not been moved, it updates the screen showing all the actual colors chosen. The time between mouse movement and screen update is variable and can be trimmed to one’s liking.

So what good is the program? Well, not a whole lot I’m afraid except for it’s one saving grace—512 and 4096 colors. In both modes a maximum of 25 colors can appear on each scan line. However, about 15 to 20% of the colors in the 4096 color mode have a tendency toward flickering to a degree it becomes an annoyance. This is somewhat dependent on the shade. The rest of the colors flicker very slightly or not at all. In the 512 mode all colors are solid.

Overall, one cannot help but get the impression this product is not finished being developed. Some of the radio buttons on the special function screen are blank. Some error trapping is neglected and some abilities are lacking, i.e. the ability to load 512 mode drawings into 4096 mode.

Recommendation: Should one buy this program? Well, the price is very reasonable (Retail is $45, but I’ve seen it discounted down to $25). The program does have good potential for becoming better. So, if 4096 colors are important, one might want to go ahead and purchase it and get any upgrades as they are made available. In fact, I talked with Eidersoft England and an upgrade was being worked on with some added features and some of the bugs worked out.

Animation is possible in medium resolution which is not possible in any other drawing program I know of. Also, if one has one of the other powerful paint programs—N-Vision, Degas, Degas Elite or Neochrome—one can do his drawing with it in 16 colors, load the drawing in Quantum Paint (it will accept Degas and Neochrome files into any of the four modes) and then proceed to add 4096 colors. ●

Atari To Release Fourth Edition Of TOS

by D. F. Scott

The Operating System (TOS) for the ST and Mega series of computers is being revised for the third time in its history, Atari officials tell *Computer Shopper*. The manipulation of files on the desktop, a new GEM File Selector box, and faster handling of floppy and hard disk drives will be among the improvements due for release to the public in the final quarter of this year.

In an exclusive interview, chief TOS developer Roy J. Good stated many planned improvements had to be cancelled due to lack of downward-compatibility with applications written for the older TOS. Specifically mentioned was the update for the GEMDOS function malloc ($48), which is used to allocate memory for applications. Many programmers had written their own code to overcome the deficiencies of the older malloc, and this code will not run properly with the newer malloc in place. Roy Good called programs containing such code “misbehaved,” products of “just flat-out bad programming.”

Good, who was hired by Atari last January from Fortune, a Unix development company, also said directly relocating a file from one directory to another will be one new feature of the revised GEM Desktop. This way, a file can be moved from filepath A:\ to filepath A:\PICTURES without having to actually copy the file. Picking up a file symbol from the directory window with the mouse and moving it on top of a sub-directory symbol will bring up a dialog box giving the user the option of “Copy” or “Move.” If the user chooses the latter, TOS will merely rewrite that file’s location in the disk’s File Allocation Table without having to perform a buffered copy operation.

The familiar, perhaps infamous, GEM File Selector box (often abbreviated FSEL) will be replaced entirely. FSEL is used within GEM applications for the graphic selection of files stored on disk or virtual device. The new version reportedly will contain 16 radio buttons representing available floppy drives, hard disk caches, or RAMdisks. Poking the button marked “B,” for instance, changes the active device to B:\.

The “Directory” line which establishes the current filepath will now be fully-editable. Earlier editions used to replace specific path delimeters typed by the user, such as “PICTURE?.*,” with “*.*;” disengage FSEL when the “Return” key was pressed; and even crash the system altogether if the underline “__” chartacter was typed into the “Directory” line. These three bugs should be completely eliminated with the new version of the File Selector.

Furthermore, FSEL will let applications send it a string of ASCII characters long enough to contain a fully-legible English-language title. For instance, “PUBPART.PRG” may show up instead as “Publishing Partner.” FSEL will also be able to organize more than the 100 files it was previously limited to; and will also be able to fully retain the Disk Transfer Address buffer location and default directory between FSEL function calls, as well as a full bit-image of the screen contents “underneath” the Selector box for redrawing purposes. This way, FSEL can pop up in the middle of an application painlessly, while retaining the same information between accesses.

Here is a list of other confirmed major improvements to TOS:

The FAT structure of the ST’s disks has been identical to that of MSDOS, with the exception that some of the bytes in MSDOS disks’ boot sectors have been ignored or overlooked by the ST formatting system. These bytes will no longer be ignored, and will be written in the style of MSDOS.

The “Undo” key will halt a file transfer in progress.

GEM programs placed in the sub-

continued on page 369

More On Multi-Tasking continued from page 213

Scott's June 1988 "Updates On Three *Computer Shopper* Articles."

D.F. Scott states, "The key to multitasking is open-endedness, or each process sharing the responsibility of fulfilling a single designated purpose." Just plain wrong! There is nothing in any, definition of multi-tasking from computer scientists, or other knowledgeable, experienced computer professionals that I have ever heard that requires a single designated purpose of the software being multi-tasked.

Scott then goes on to say, "Running WordPerfect and playing Marble Madness concurrently may be multi-tasking to some, but to a programmer who fails to see a single purpose in the two programs cohabiting the system, it is not." All I can say is, speaking as a programmer, this sounds like a perfect example of multi-tasking to me. A quick poll of 4 other experienced senior software engineers I work with show that I am not alone in this belief.

Scott then goes on to site an IEEE definition of multi-tasking. He keys in on the use of the word interleaved. I could be way off base here, but I suspect strongly that engineers mean interleaved in the sense of non-serial execution, taking serial execution to be the completion of one job before the initiation of the next. Being a computer scientist, and not an electrical engineer I am guessing about what they mean.

Scott then states, "In order to accomplish that objective, the processes must share more than mere data. They must swap spaces with each other, and often share the same program code." As far as I can determine here, the objective being referenced is the (nonexistent) "single overall objective" Scott seems to feel is required of multi-tasked processes.

Here we have a mixture of operating systems concepts being thrown together. Let's pull them apart and address each item spearately. To start with is the notion processes must share data. In operating systems circles, sharing of data is not only not required for multitasking, but the casual sharing of data is often prohibited by the system. Some systems prohibit sharing of data period.

In terms of deadlock protection/detection, a real problem in sharing data, Unix is very sloppy. That is one of the reasons Unix was resisted by the business community. Most multi-tasking operating systems require a clean separation of programs, and require special effort on the programmers part to allow them to share data.

At this point I need to explain deadlock. In a computer deadlock occurs when one or members of a set of processes are infinitely blocked. I don't have the time or the space here to teach an operating systems class, so I'm going to give you a few simple examples that illustrate the problem, and hope that you get the gist of it.

Picture an airline reservation system. Travel agents across the country can tie into Delta's computer base and find out what seats are available on a given flight. You want to visit Aunt Bea and you ask for a non-smoking isle seat. The travel agent punches a few keys and soon has a list of non-smoking isle seats that have not been reserved.

To get the seat information, Delta's computer had to read in a disk file, and find all the records of non-smoking isle seats that had not been marked "reserved." The list is displayed on the local travel agent's screen and you select a seat. While you have been deciding which seat to take, lots of other people across the nation have also been looking at the same flight's open seats.

Let's say luck isn't with you today and you select a seat that was just selected by someone else. The other guy's travel agent punches keys a little quicker than your's and when your request gets there, it is rejected. The terminal beeps, the screen flashes and your travel agent frowns.

When your request arrived, Delta's computer looks in the file for that flight, checks to see if the seat is marked open, and finding it marked reserved, it rejects your request.

Let's look at this "searching" and "updating" of data a little closer, in terms of multi-tasking. Let's assume the Delta computer is multi-tasking and there are several "processes" searching the files for data, and marking selected seats reserved.

As a programmer for Delta, you want to make sure that no two people ever get the same seat. Let's say you write a program to mark seats reserved. The first thing you do is to check and see if the seat is already reserved. If the seat is open, you can then mark it reserved. Or can you?

continued on page 316

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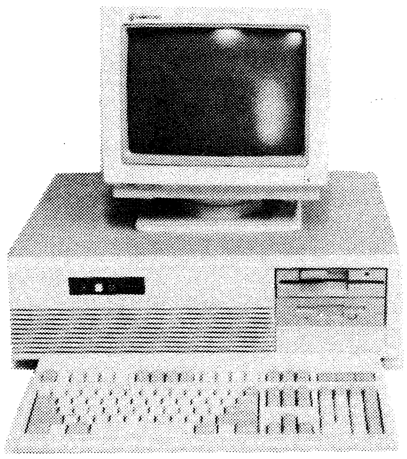

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ATARI

Applying The Atari

by Jeff Brenner

This month marks the fourth anniversary of the "Applying The Atari" column! It's been four fast-paced years of news, reviews, programs and projects (and reader mail, of course) specifically for your 8-bit wonder. And while the 8-bits may have long past their heyday, the 8-bit community has remained strong and very much interested in discovering new ways to use the power of these versatile machines.

A number of readers wrote in about an article in the June 1988 issue, "The State Of The Eight: 8-Bits Alive And Running" wondering what happened to a portion on the Atari 8-bit computers that I wrote for the article, since part of my segment appeared to be missing after a continuation on another page. This was a layout error, and was not, as one reader suggested, an "anti-Atari conspiracy among magazine editors." The short piece appears below in its entirety. Actually, the piece is quite appropriate for this anniversary column, since we can reflect upon the changes that have occurred over the years, and gain some insight into the direction the 8-bits are heading to in the future.

The Atari 8-Bits

A common misconception about the 8-bit Atari computer line, which consists of the original Atari 400 and 800, the 600XL and 800XL and 1200XL, the 65XE and 130XE, and the new XE Game System, is that the 8-bits are "orphan" computers, abandoned by their manufacturers in favor of different (specifically, more profitable) ventures. In Atari's case, the shift of company attention and resources to the ST line as a result of the success of the ST computers has been cited as proof of Atari's apathy towards the 8-bit line. But, as Atari will say itself, nothing could be further from the truth, and the cost-effective power of the 8-bits (such as its versatile graphics capabilities) combined with its wide base of third-party software and hardware products have made this machine a valuable tool to this very day.

Unlike true orphan computers, such as the TI-99/4A and the Timex Sinclair, the newer 8-bit Ataris continue to be sold in retail and mail order outlets (the 65XE, 130XE and XE Game System). In fact, Jack Tramiel has said that he will stock his newly acquired Federated stores with 8-bit Atari products. And while 8-bit support from the big software companies has been waning, dozens of small, independent firms and programmers have acted quickly and anxious to fill the demand for 8-bit software and hardware products. The result has been commercial products such as TurboBase, one of the most powerful and versatile database programs available for any 8-bit machine; Daisy Dot and Daisy Dot II, new public domain multi-font typesetting programs that would put some commercially marketed IBM programs to shame; *BASIC TurboCharger*, a new book and diskette set that lets Atari programmers make the most out of Atari BASIC; and an endless stream of fascinating hardware products and peripherals, such as an inexpensive picture digitizer, a multisystem box, high-speed disk drive modifications, and memory expansion kits to take the 8-bit computers to 1 Megabyte and beyond. Magazines such as *Antic* and *Analog* (and *Computer Shopper*, of course) continue to feed Atari owners with 8-bit articles, programs and information.

Atari, too, has shown that it recognizes the strength and magnitude of the 8-bit community. The company recently released the XE Game System, which is fully compatible with 8-bit computer software (with a disk drive) and promises to revitalize major software manufacturer interest in the 8-bit machines in a very big way. Atari has also recently released the SX212, an inexpensive 300/1200 baud modem that's fully compatible with the 8-bit machines, and will soon be releasing the XF551 disk drive, a double sided, true double-density drive featuring a specially designed DOS called ADOS.

But it is undoubtedly in the active Atari user's groups where one will see how very much alive the 8-bit is. These users' groups and their dedicated members develop and share programming ideas, hardware projects, software reviews and recommendations, technical and compatibility information and much more. Many publish newsletters and maintain public domain software libraries. Several 8-bit software products have been designed as a result of letter-writing campaigns by users' groups urging manufacturers to continue developing software for the 8-bit machines. These groups are also the ideal place for the new Atari 8-bit owner to learn about his or her machine.

New Products

From Merrill Ward & Associates comes *The Celebrity Cookbook*, volume 1 and the Graphics Operating Environment for the 8-bit Ataris. Shelly Merrill, president of Merrill Ward & Associates, writes:

In reference to your April 1988 column, I thought that you might be interested in the latest enhancement of the 8-bit Atari operating system, a Graphics Operating Environment (GOE), developed by our company. Our first external program to use the GOE format is *The Celebrity Cookbook,* Vol. 1, a home catering program (retail $34.99). The Graphics Operating Environment and the 8-bit cookbook both use the ST mouse plugged into user port 1 of the 8-bit computer. The GOE (St, jr.) program was released in June 1988 and it is in a cartridge (retail $49.99 to 59.99).

The catering program contains approximately 50 celebrity recipes collected by such notables as Sophia Loren, Frank Sinatra, Bob Hope, Ronald Reagan, etc., a wine and bar guide, party tips, diet secrets of the celebrities and a personal recipe filer.

The ST/8-bit cookbook is being purchased from us by Atari Corporation and is carried in all of their Federated outlets.

Shelly Merrill, president
Merrill Ward & Assoc.
Palm Springs, California

A demo disk of the Graphics Operating Environment that I received from Merrill Ward & Associates was quite interesting, although the majority of the features had not yet been implemented. The program uses the same mouse used by the ST, plugged into joystick port 1 on the 8-bit, and lets you control files and load programs using a desktop and icons very much like the ST. The demonstration disk also contained a sample drawing program and word processor which looked very much like the ST's Neochrome and Newword. I'm anxious to see the completed cartridge version of GOE *The Celebrity Cookbook*, Vol. 1, utilizes this graphics environment and looks very much like an ST program when running on the 8-bit. *The Celebrity Cookbook*, Vol. 1, will be reviewed in a future issue. For additional information, contact: Merrill Ward & Associates, 255 North El Cielo Road, Suite 222, Palm Springs, CA 92262.

Another new title released for the 8-bit machines is Cross-Town Crazy Eights, from XLENT Software. You can play against one to three computer opponents, or, if you have a friend with an Atari, modem and Cross-Town Crazy Eights you can play against each other and up to two computer opponents. The program allows you to make an "answer only" copy of the program to give to a friend so that you can

continued on page 236

ADAM

The ADAM Forum

by Paul Pappas

User Groups

In order to fully utilize a computer it is helpful to join at least one, if not several user groups. A user group is a collection of people who "use" a particular computer (or related item). These groups may be informal "computer clubs" or professionally run national organizations. Most publish a newsletter which contains product reviews, tips and tricks, program listings, and news about upcoming projects. Many maintain a library of public domain software for sale or trade.

Just as user groups vary, so do their members. From the professional to the novice, just about every level of proficiency is represented. Commonly the more knowledgeable users organize the clubs activities, often holding informal seminars designed to teach what they learned "the hard way." If you have a question concerning your computer, user groups are often your best source of information.

The importance of user groups, especially local groups where you may attend meetings, can not be overemphasized. There are many excellent local user groups, and I urge you to join one. I can't list them all here, but will be happy to send you the address of the group(s) in your area. Follow the instructions I give to send me your request. Please note, I will discuss some of the more active local groups in future columns.

On the national front there are two groups who's newsletters are "required reading" for the serious ADAM user. They are Digital Express—[PO Box 37, Oak Hill, WV 25901] and Northern Illiana ADAM Users Group (NIAD)—[PO Box 1317, Lisle, IL 60532, (312) 961-3529].

Both organizations publish superb newsletters and offer retail and public domain items to their members. I highly recommend you subscribe to both. Subscription rates are as follows—$24 annual for Digital Express and $26 anual for NIAD.

Hardware

It's hard to believe a computer released without a standard serial or parallel port now has such a wide variety of hardware add-ons to choose from.

Want to use an external modem (serial port) or fast, quiet dot-matrix printer (parallel port)? No problem, both ports are available. Need a RAM expander? Not the original 64K board but a 256K board designed for todays advanced programs. How about a disk drive? Choose from the single sided 5 1/4 inch (160K), the double sided 5¼ inch (360K), or the up and coming double sided 3½ inch (720K).

Did I mention the clock/calendar boards, internal 1200 baud modems, speech synthesizers, and 80 column video boards? There is even a device for creating Digital Data Packs from standard audio cassettes called the MegaCopy Interface. I personally use SmartLOGO and a parallel interface to drive a color plotter.

When you think about ADAM peripherals three companies come to mind. They are In House Service Reps—[620 Harmon Cove Towers, Secaucus, NJ 07094, (201) 867-7038]; Orphanware—[5665 Myers Rd., Akron, OH 44319, (216) 882-4720] and TriSyd Video Games—[26 Florence Cresent, Toronto, Ontario, Canada M6N 4E4, (416) 769-6446].

In House Service Reps produces RAM expanders and disk drives. Orphanware, the largest of the three, produces serial/parallel ports, disk drives, RAM

continued on page 375

ATARI

Applying The Atari continued from page 232

play against your friends without the need for them to buy their own copies. The "answer only" copies will function only when playing by modem against the owner of an original disk. Contact: XLENT Software, P.O. Box 5228, Springfield, VA 22150.

Thanks to a letter writing campaign by 8-bit Atari owners and user's groups, Springboard has finally released an XL/XE version of The Newsroom, its popular newsletter designing program. The Newsroom features over 600 clip art pieces that can be incorporated into newsletters, a built-in word processor that uses up to five fonts, and automatic layout such as wrapping text around pictures. The Newsroom is $49.95. Also available are three volumes of additional clip art pieces. Clip Art Collection Volume 1 contains over 600 pieces of general occasion art; Volume 2, over 800 pieces of business related clip art; and Volume 3, over 600 pieces of sports/recreation art. Each clip art collection retails for $29.95. Contact: Springboard, P.O. Box 141079, Minneapolis, MN 55414.

Reader Requests

Reader Richard Cooke had requested information on software for bowling league secretaries. In addition to the Bowling Secretary mentioned last month, two additional programs are available. Reader Stanley W. Wood writes, "I wrote software for my league two years ago which was very helpful for myself. I'm sure he, and any other inquirers, may be interested in it. If you could send me his address, I could send him some information on my software. Also, any other inquiries would be welcome." Others interested in this program can write to: Stanley W. Wood, 5473 S. Afton Pkwy., Baton Rouge, LA 70806.

Reader Scott Sheck writes, "In regards to a reader's search for a Bowling League Secretary program, I currently sell such a package. It will run on any of the Atari 8-bit computers with at least 48K and requires a disk drive and a dot-matrix printer. It will handle just about any league and over 200 secretaries currently use it each week. For pricing information and sample output sheets, write to LeagueSoft, 9075 Centerway Rd., Gaithersburg, MD 20879." Scott's software handles an unlimited number of leagues; Mens, Womens and Mixed leagues; up to 110 bowlers per team; up to 40 roving substitutes; bowler and team forfeits, vacancies, blind scores and absentees; adding, deleting or moving bowlers and subs to different teams; and can produce summary reports any time during a league.

Now that we have plenty of bowling league secretary software, how about some software for other types of record keeping, as the following readers requests:

Dear Jeff:

I'm writing to see if you or your readers can help me find a philatelic program for my Atari 800XL. I need a program to inventory and keep track of thousands of stamps.

Ronald Santiago
APO New York

In the past I've recommended any of several database programs available for the 8-bit Atari for any type of filing purposes, but there's a good chance that there is 8-bit software available specifically for stamp categorizing. If any readers are using any good philatelic software or know of any, please write in and let us know.

Next Month

That's all the space we have this month. Next month we'll have more reader mail, new products and newsletters.

Readers' questions, comments and contributions are welcome. Address all correspondence to:

Jeff Brenner
"Applying The Atari 8/88"
c/o *Computer Shopper*
P.O. Box F
Titusville, FL 32781 ●

More Atari on page 467

TANDY

The CoCo Column continued from page 230

From responses we received, the most requested types of software people would like to see are RAM resident utilities, a good and easy to use database designer program, and desktop publishing. RAM resident utilities, like Sidekick for MSDOS other "hot-key" programs are desired. Those who desired better desktop publishing programs were disappointed with the current programs available.

Other software wishes include video games, a teacher's quiz designer, a translator which would translate other computer's programs to run on a CoCo, and programs which run in a Multi-Vue type environment. One of our respondents wanted to see an operating system that was a mixture of RSDOS and OS9 for those not fully experienced in the OS9 system.

Articles Of The Future

It's always a good idea to keep in touch with the "reading public," and why I asked question number four. "What kind of article(s) would you enjoy reading in the CoCo Column?"

Articles of the past which our respondents like and wish to continue in the same manner are hardware and software reviews. We received multiple requests for articles on hardware, floppy and hard disk drive topics, utilities, and how OS9 operates.

Additional responses included our occasional reader letters, reviews of public domain software, memory expansion for both the CoCo 2 and 3, and how to interface peripheral devices through the cartridge port. Machine language programming and techniques, patches, and beginner's articles were also requested. Of interest, was a request for an article on companies which produce software or hardware for the Color Computer.

These requests are quite interesting, and in the upcoming year, we'll give our all to continue with the best coverage of the CoCo, and many of these ideas will be heeded!

Interesting Comments

Among the answers to our questions, were a few letters which contained comments on anything from Tandy Center service to justification of a well equipped computer system.

Billy Pogus, of Lake Havasu City, Arizona was one of those who feels his computer hobby compares with hobbies of others. "Over the last seven years, I have invested about $5000 in the equipment I have, around $700 a year." Billy continues, "I don't consider this excessive. Many of my neighbors have over $5000 in a bass boat, and $25000 in an RV which are used about four weeks out of the year. I know some folks who spend over $700 a year on beer. At least my computers won't ruin my liver, get me a DWI, or trying to keep up with six operating systems, all of which helps forestall mind-rot, an occupational hazard of retirement. For the retired person who is wondering what to do with his (or her) time, I strongly recommend buying a computer and learning to program with it."

Henry Watkins, Jr. of Clearfield, Utah is a bit upset with service he receives from Tandy. He says, "I get from non to lousy support from Tandy Computer Centers here."

Also upset is Jeffrey Wilson of Mesa.

continued on page 238

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More On Multi-Tasking

continued from page 215

Remember that the computer is multi-tasking. You read the current seat record, examine the record to see if it is free, mark it reserved, and save the modified record. On a multi-tasking system, this chain of instructions can be interrupted at any point, and the CPU could run another process.

The danger is that you read the record, find it open, and then the CPU does a context switch and starts running another process. The second process reads the record, finds the seat open, marks it reserved and then stores the modified record. Sometime later your process starts up again, and it marks the seat reserved, and saves the modified record. Bingo, two people with confirmed reservations for the same seat.

Sharing data on a multi-tasking system can be dangerous. To get around this problem, we can just implement file locking. File locking allows us to program safe in the knowledge that only one process can be working with a file at a time.

A simple solution is to write a file manager program that runs as a process. When a process wants to use a file, it sends a message to the file manager saying "I want to use the flight 403 file." Your process then waits for an answer from the file manager before it proceeds.

If the file is in use, the manager doesn't send the answer to you, and so your process just waits and waits and waits. If the file is free, the file manager marks the file as in use, then sends a message to your process that says "go ahead, the file is yours."

After your process finishes with the file, it sends another message to the file manager saying "I'm done with the flight 403 file." The file manager marks the file free, and waits for the next message.

Now we don't have to worry about corrupted data, but we have introduced another, more subtle, more troublesome problem, deadlock. To see what can happen, assume we have two processes called A and B. These processes use two files, file1 and file2.

Process A gets a file lock on file1, and process B gets a file lock on file2. Process A now tries to get a file lock on file2 so it can finish it's work. It can't get a lock on file2 so process A starts waiting for process B to finish. Now what happens if process B tries to get a file lock on file1? Process B can't get the file lock on file1 because process A has a lock on it. Process B now starts waiting for process A to finish. Deadlock!

The problem is not just files, and it is rarely just two processes. Any shared resource that is "Corruption" protected by a locking mechanism can lead to deadlocks. You certainly don't want two processes using the same printer at the same time. Usually what happens in deadlock is that you get a long chain of programs that form a deadlock.

Let's label all processes PX where X is some process ID number. We'll label all resources 'RX where X is some resource number. You can run into a situation where P1 has R1 and is waiting for R2. P2 has R2 and is waiting on R3. P3 has R3 and is waiting on R1. Deadlock. Chains like these can get very long and very complex.

On machines where there are hundreds of processes, you as a systems programmer worry about deadlock a lot. Some operating systems make you ask for all resources you need before you start. You get everything you need or nothing at all. This only works in some cases. What happens if you need R3 only if record 6 in R1 is free?

Forcing every process to ask for and receive all resources before it starts is not very practical. What about a program that tallies up all the days overseas transfers and prints a report. In a huge worldwide bank, such a program may take an hour to run. There you stand for an hour, not able to do business because too many of your files are locked.

Some operating systems try to detect when deadlock occurs and kill off some processes to release resources so the rest of the programs can run. Which process do you kill? How do you know if data corruption will occur as a result? What happens when an extra 10 million shows up in a bank in England and in Norway? Who gets the money? How do you explain it to your boss?

There is no real solution to this problem, we can only try a few simple workarounds that may or may not work in any given case. Unix is even less worried about these problems. If you get deadlock it assumes that someone will notice that the computer is no longer computing and that a system administrator kill off the correct process to break the log jam.

continued on page 362

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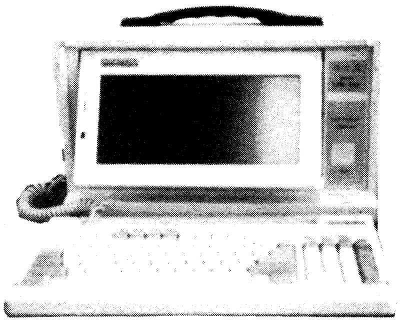

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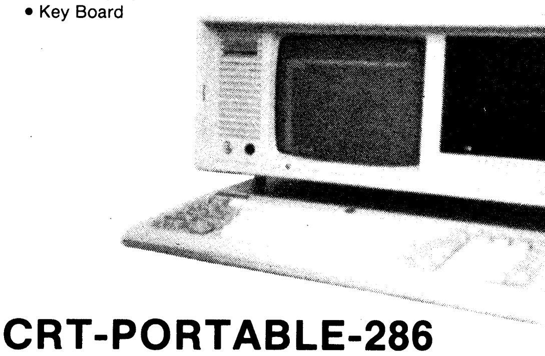

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More On Multi-Tasking

continued from page 361

In short, sharing of data is not required for multi-tasking, and allowing it just leads to problems. Fixing those problems lead to more problems, and so on. If people really insist you might allow data sharing, but it is insane to suggest that it is required in order for multi-tasking to be taking place, that just isn't the case.

The next little concept rolled into the bundle is "virtual memory." ("They must swap spaces with each other...") I don't know how this got thrown in as a requirement for multi-tasking. Some very early minicomputers became extremely popular because they offered virtual memory, and they were never multi-tasking. By the same token, I have 4 megabytes of RAM in my 386 machine at work, and I often multitask all day long without ever using virtual memory.

In the very early days of computing, memory cost a bunch. A megabunch. People could afford to buy only small amounts of memory for their machines. This limited the size of the programs you could run. One day a bright fellow (I can't recall who) observed that you didn't need the whole program in memory, just the data and the small part of the program that was running at that instant.

Virtual memory was born. You bought a machine with 4K of RAM. It came with a small hard drive (or more likely a small drum). You wrote a small piece of software to handle address errors. You modified the CPU by adding a small bit of address circuitry to it. You modified the loader to only bring in as much of the program that would fit in memory at one time. When the program was loaded, you started running it. Pretty soon it hit an instruction like "jump to address 8000."

The hardware said, "You got no RAM there Boss" and called your address error handling routine. The address error handling routine looked at the address that caused the error and went out to the hard drive to find the code that should live at that address. The code was loaded into low RAM and you recorded some information in the new CPU circuit.

Let's say you loaded the missing code into memory starting at address 0000. What you did was record 8000 in the address mapping register you added to the CPU. Every time the CPU sent an address to the address bus, the address had 8000 subtracted from, so the address that actually got to memory selected the proper instruction.

It didn't take long for people to realize that you could do the same thing with data that they had been doing with instruction. People started asking how big a chunk should we bring in when we bring in a chunk? The answer is about 512 to 4096 bytes, wth 1024 or 2048 being good all around numbers.

The size of the chunk you bring in depends on something called locality of reference. What we are talking about is on the average, how far away does the code get? Most programs have many fairly small loops, for most of the time, most programs run around in one loop or another and the instructions for these loops tend to be clustered together.

If you bring in too little data, you spend too much time bringing stuff into memory. Look at the extreme case, you bring in a single instruction each time. In this case you spend your whole life reading an instruction off of disk (which takes a very long time as far as the CPU is concerned) and modifying the contents of the address mapping register. You spend little time actually executing instructions. Bad.

Look at the other extreme, fill all available memory with instructions. Sooner or later, one of the instructions will reference some data, but there is no data in the machine, back to get some data. Done with the data? Get the instructions again. Oops, the instruction needs some data. Whirl, Whirl, Whirl goes the disk, but your program isn't running. At least it isn't running fast.

You have to achieve some balance between the extremes when you bring stuff into memory. Too much and you spend your life waiting on the disk. Too little and you spend your life waiting on the disk. Both of these conditions are called thrashing. The drive is going like crazy, but the throughput is slowed to a crawl.

A lot of computer scientists studied system behavior with different "page" sizes (as the chunks being swapped came to be called) and they found that 512 to 4096 usually provided pretty fair behavior for most systems on most jobs.

Of course it would be nice if you could have chunks of data and chunks of instructions in memory at the same time, and you could because there were several pages in most computers. If we used 512 byte pages, then our little 4K machine had 8 pages. Of course you had to know which piece of the program was in what section of memory. The pages tend to get jumbled up over time because a program will run some loops here, then jump to another area and run some loops there, then jump to another area and so on.

This means that you had to have more than one address mapping register, and when you got an address, you had to look in all the address mapping registers and see if the proper page was already in memory somewhere. If it wasn't, then you had to bring in the page and update the address mapping registers. When you get ready to access a page and it's not already in memory, you get a page fault.

A page fault means some page leaves memory, to make room for the new page. Who leaves memory? How do you decide who leaves memory? More studies of computer system behavior, more computer modeling. Back to the blackboard to work out some theories and proofs about paging. This is what computer scientists do.

The hardware and software needed to support this paging activity soon reached the complexity level that the hardware became like a small, special purpose CPU, and people referred to it as a Memory Management Unit. An MMU today is most often an add-on device, but the newer chips being

continued on page 364

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More On Multi-Tasking

continued from page 362

designed today have the MMU built into the CPU. Today's MMU's tend to handle several more jobs than the simple address translation it started out with. Often dynamic RAM refresh becomes one of the main jobs of the MMU.

The ST has something referred to as an MMU, but this MMU doesn't support virtual memory, the main job of most MMU's. It is really more of a glue chip for memory interfacing than a classic MMU. Motorola and other vendors build MMU chips to provide virtual memory for 68000 and 68010 chips. The 68020 and 68030 have MMU's of limited sophistication built into the CPU.

The item we need to look at is reentrancy. D.F. Scott alludes to this with "... share the same program code." Today, programs built by modern high level languages tend to group the pieces that make up a program into sections. If you have followed my hacking column you may recall mention of the basepage structure.

There are 3 sections to ST programs. The text section is a collection of all the executable code. Most C programs are made up of a collection of routines. Each of these routines are placed end to end by the linker at link time, and they come into memory as a contiguous block of code.

Other operating systems support different models of program usage. In the early days of computing, the system often had a collection of routines that handled I/O and other special tasks that were loaded into memory and shared by many different processes. In those days, programmers often wrote loops where the code inside the loop would actually change the instructions stored in memory that made up the program. This allowed skilled programmers to squeeze another 10 or 20 micro seconds off of a loop. It also meant that the code could be run only once, because the instructions were changed by the program.

You could get away with that in an application program, but the system code could not modify itself. The system code had an even more important restriction. In the days when memory cost a bundle, you only wanted one copy of any given routine in memory. Today when a C compiler links a program, the I/O routines and math routines and any other library routines you need are linked in. This means a copy of those routines are added to your program, making your code that much longer.

Memory is comparitively cheap these days, so we don't worry about this added size, but it used to be a very big issue. In those days, I/O routines, math libraries and the like tended to be made part of the system code and everyone shared the use of the routines instead of having their own copy.

All of these features mentioned are desirable in a multi-tasking operating

continued on page 366

Photon Paint HAM

continued from page 360

as you drag the mouse to the right or left you'll see the twists begin to appear, looking rather like an hour glass gone mad. Since the manipulations of brushes are cumulative (a cone can be wrapped onto a cube, for example) it is possible to impart many twists to the same brush, simply by selecting that option again and again until you are satisfied.

If you've ever waited on a program to perform some complex remapping—all the while wondering whether it will work or crash while you're staring at the sleep symbol—Photon also addresses that anxiety. When remapping is taking place, and when the Fast Menu is visible, the program will count down the time needed to affect the change. It doesn't mean a great deal, except in terms of inspiring confidence, but that alone is worth while.

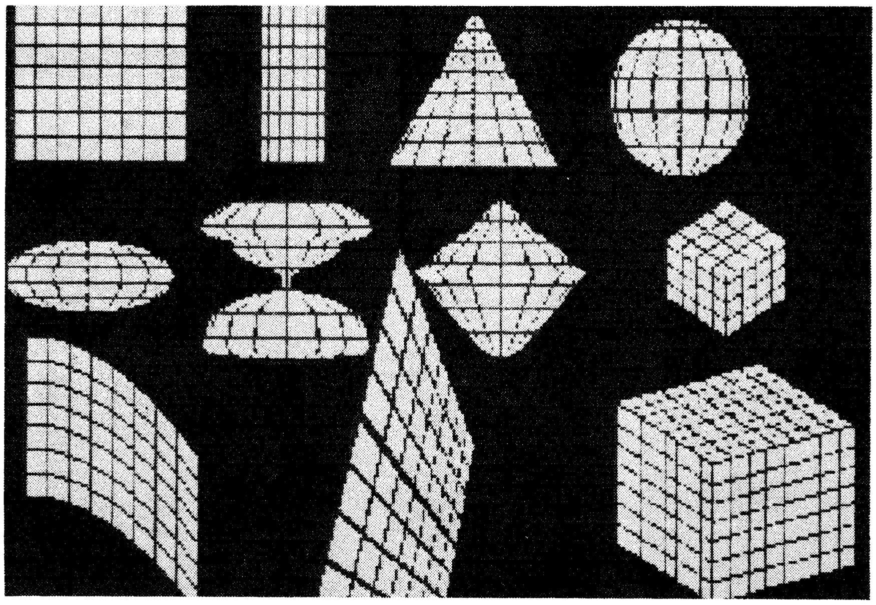

Figure 4

When it's time to add text to your picture, you'll find that Photon gives you the standard Amiga Notepad fonts in the standard sizes. In addition to enhancing them with Bold, Italic and Underline, you can also use the fonts as outlined (rather than filled) and in reverse. In this case, Reverse does not refer to reverse color but to writing in reverse, backward and from right to left.

You can also load fonts from other sources, such as the several disks published under the ZumaFonts label, and the only restriction on size seems to be the size of your working screen and of your memory: if you insist on using 127-point type, you'll be able to write about two very short lines. Amigas with only 512K may not be able to operate with fonts larger than 60 point.

Further, the fonts as used in Photon Paint can be affected by both the Blend and Luminance options, Luminance being a mode that allows you to control the direction of light on a "3-D" brush or, in this case, font.

The documentation for Photon Paint is good, written in a rather chatty fashion but informative for all of that. It is written so as to explain each pulldown menu in turn, moving from left to right across the screen. In other programs, I've complained about this approach because that is not the way programs are used, but here it seems to work—perhaps because of my familiarity with most of the terms and certainly because in manipulating the brushes it was helpful to have all explanations in one place.

Following the explanation of the menus are several tutorials which will have you using the picture files on the included data disk to perform some of the more sophisticated functions. By the time you've gone through these, you should understand most of the program's features.

Photon Paint is a product of Microillusions at P.O. Box 3475 in Granada Hills, CA 91344. Suggested list price is $79.95. The program is copyable and may be installed on a hard disk. Although Photon Paint will run with 512K and a single drive, one megabyte is recommended for using the 320x400 (interlace) mode and a second disk drive will be a big help and a hedge against disk swapping, since overlays are occasionally read from the program disk, making it convenient to be able to keep that disk in DF0: and your data disk in DF1:. ●

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Atari ST Story

continued from page 213

representing commands and parameters as symbols and English-language statements, offering a human element to the process of computing.

When Atari received a license from DRI to produce a 68000 version of GEM, it was literally left alone to transport its C-language code over to the ST. Had GEM been written entirely in assembly language, the job may have been impossible; PCs and STs, because of their contrasting CPUs, read 16-bit words in reversed byte orders. Thankfully, C to one computer, for the most part, is C to another. Nonetheless, the conversion process for Atari's software team was still like building a bridge between countries separated by an ocean.

TOS Salad

The Operating System, as it is actually called, is the coalition government of the Atari ST. At its heart is the Basic Input/Output System, BIOS which consists of the 12 fundamental OS tasks. These include: the access of free RAM space, deciding whether a peripheral device is ready for input/output, the actual input/output to that device in characters or sectors, and the maintenance of the File Allocation Table (whose structure is identical to the FAT of MSDOS). On top of that, the designers added 40 Extended BIOS functions, which handle the specific routines for monitoring the serial and parallel ports; the mouse, joystick, and MIDI ports; and the one chip which acts as a "Grand Central Station" for all this I/O data throughput—the sound chip. The Yamaha YM-2149 sound chip, originated for use in coin-operated video games, is so fast that it's used for channeling data through the I/O ports while emanating three-channel sound.

The BIOS on any computer is the true operating portion of the system; it performs the functions which you, the user, aren't even fast enough to follow as they occur. Examine in your mind a document from any word processor just appearing on a computer monitor. For each single letter and number to appear on the screen, a handful of BIOS functions had to test the readiness of the screen to handle that character, push its ASCII value into screen RAM, and verify that screen RAM actually received the character. Once in a long while—from the BIOS's point of view—it looks up from its work to see if you want anything. If you haven't pressed a key, the BIOS will happily return to its business, ignoring you in the process.

This demonstrates the vast differences between an operating system at the user level and at the processor level. This is not to suggest that computers are somehow more capable than humans; in fact, if you ever want to disprove the notion that someday computers will be built on neural, brain-like models, just give them this argument: Computers deal only with numbers. Humans can't—and shouldn't.

GEM was built for Intel CPU-based, MSDOS machines; and TOS was built for a Motorola 68000 machine. In order for GEM to cross over into the world of TOS, there had to be built an MSDOS-like bridge. GEMDOS is that bridge. It contains 51 operating functions which parallel MSDOS in name and hexadecimal call number. Although they tend to echo BIOS and XBIOS functions already in TOS, they present a more familiar programming world to an experienced PC software developer.

Of the functions GEMDOS performs exclusively, it handles the heirarchy of disk directories, the specific access and manipulation of files within a directory, and the allocation of memory blocks for user routines. GEMDOS resides on a plane, if you will (if you don't mind my speaking Tibetan), between the processor level and user level—a sort of astral plane between the elements and the mind.

The "props department" of GEM is the Virtual Device Interface, which is a series of compiled C-language subroutines for graphic output. VDI subroutines can produce pattern-filled areas, function-plotting arrows, and rudimentary shapes. It was designed for output to any graphic output device—printer, screen, plotter, LCD-illuminated overhead projector, Goodyear blimp. VDI has access to parameters containing the output device's visual resolution and color capacity, as well as a coded driver describing just how graphic output is accomplished on that device. VDI doesn't really know or care what it's outputting to; as far as VDI's concerned, the device "virtually" exists only

continued on page 366

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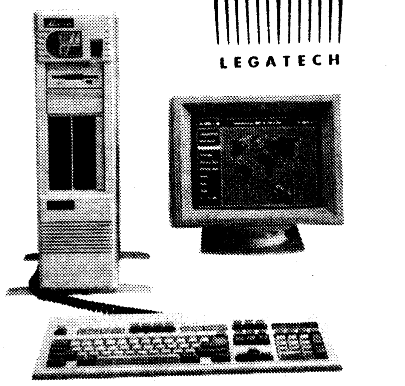

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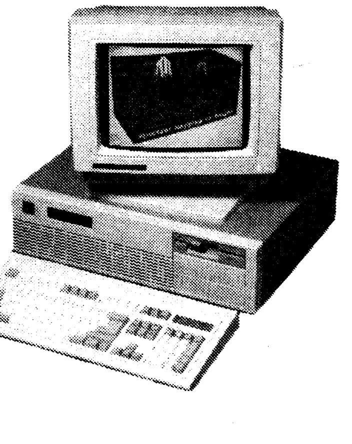

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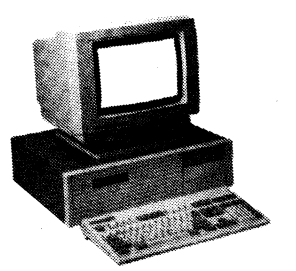

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Atari ST Story
continued from page 365

in theory. The driver takes VDI's generic output and tailors it to fit the specifications of the output device.

The official GEM "script coordinator" is called the Applications Environment Services. AES is comprised of C-language routines whose primary purposes are to handle multiple windows on one screen and to set up graphically-represented areas for user input, such as the menu bar and the window frame controls. To better understand its purpose, picture in your mind a dumb terminal—a virtual fossil. Such an obsolete gismo merely receives character data from an outside source and echoes it to the screen without question. Anything you input is received and interpreted only by that remote source.

Add to that terminal MSDOS. Its command line parser opens up a sort of telegraph line to this formerly dumb terminal. Telegraphic interaction is syntactic, though not symbolic. By adding GEM, we've established a symbolically analogous mode of interaction with the terminal. Assuming it has somehow acquired critical acumen, the GEM terminal might conclude the user is trying to play charades with it, by waving graphic objects in the air and hinting what the user wants it to do.

The ST, like any other microcomputer, is essentially a dumb terminal which has been granted peripheral control and an interactive communication line with the user. In GEM, the symbolic tools for this more developed form of interaction—such as icons, word blocks, and dotted-line "shadows"—are displayed by VDI. Translating the user's communicative gestures into GEMDOS functions is the task of AES. For instance, two disk directories are displayed graphically on the screen in AES-created windows. The symbols for each entry in the directory are displayed by VDI. When the user picks up a symbol for a program from one window and drags it, with the mouse, on top of a "manilla folder" symbol in the other window, AES translates this gesture into the GEMDOS terms for "Put this program into a sub-directory."

Moving the graphic pointer onto the program symbol, pushing the left mouse button down on it, dragging it out of the window, dragging it into the other window, putting it on top of the folder's space, and letting go of the mouse button are all considered "events" by AES.

continued on page 367

More On Multi-Tasking
continued from page 364

system. Data sharing means that processes can "cooperate" and this allows you to break jobs into smaller, more manageable pieces. As the person writing applications, it falls on your shoulders to make sure your programs don't corrupt shared data, and you have to code your programs so as to minimize the chance for deadlock. The operating system cannot protect you from these things, you have to protect yourself.

Virtual memory is very desirable because you can have larger programs running on the system. In a multi-tasking system, having virtual memory allows you to have more programs jammed into the machine at one time because only small portions of each need to be in memory. The rest of the program can be out on disk until needed.

Re-entrancy is also desirable because it allows you to have more processes running on the machine by reducing the amount of space required. Each process needs it's own data space, but many processes can share a single copy of the executable code.

While all of these features are desirable in a multi-tasking operating systems, they are not mandatory. You can have true multi-tasking without them. I have not actually torn into the Amiga source code, but I suspect that it offers true multi-tasking. I wonder if there is a reader out there with a computer science background that could answer that one for us? The ST does not multi-task under TOS, but OS-9 is out there for the machine. I have not worked with OS-9 on the ST, but I have written code for OS-9 and derivative operating systems on GIMIX micro20 machines. These ports of OS-9 offer true multi-tasking.

There seems to be some confusion over what MMU hardware will do for you. Most MMU's (not all are created equal) will handle paging to support virtual memory. If you think about it, this means you get hardware relocation of code for free. After all, if the MMU can keep track of what chunk of code is where in memory and how to translate the addresses, all the circuits are in place to handle hardware relocation. This does free you from having the loader patch the addresses at load time.

Hardware relocation is not always required. Some compilers for the ST produce position independent code. In position independent code a special addressing mode of the CPU is used. In address register indirect addressing with displacement addressing, one of the CPU address registers contains an address. The displacement value is added the contents of the address register to generate they physical address.

In this case, we use one of the CPU registers as a very simple form of an address map register. Since all of the addresses used by the program are relative to the contents of this register, relocation is as simple as loading the actual load address of the program into the address register being used as a base address register.

The disadvantage of this approach is that the displacement is only a 16 bit number so programs using this addressing mode have to be less than 64K in size. Many programs can be kept under this size.

I hope the mystery has been cleared somewhat. As writers for popular consumption we have to entertain as well as inform. We walk a fine line. If we stray too far one way or the other, we are doing a disservice to the reader and it is pointless to run the article. I hope you have learned something, and I hope I haven't bored you too much. See you next time. ●

Atari ST Story
continued from page 366

These events are recognized in sequence as a queue, or "event pipeline" which, rather elegantly, is the symbolic equivalent of a sentence. If you look closely, you can isolate the passive and active elements—the nouns and verbs—within the event pipeline. Now you might realize when I say GEM adds a human element to computing, I mean that literally.

The Traps Of The Minority Parties

Atari programmed its own routines for the ST to project lines, shapes, and small bit-plane portions called sprites, which VDI falls back on when it needs help. The design of these routines—inaffectionately entitled "Line-A"—may remind one of the era of 8-bit Atari programming. You could consider Line-A the last vestiges of the old guard liberals in the ST parliament, after GEM's version of "glasnost" has taken effect.

The name "Line-A" is derived from a series of 68000 operation codes beginning with the hex digit A, which really aren't opcodes at all but uninterpretable numbers which force the CPU to jump to a "trap location" in memory. Here, by extremely clever design, special graphics routines await instead of error-trapping routines. The 68000 doesn't "learn" to avoid these deceptions, so it can be trapped again and again.

Each Line-A routine searches specific memory locations for a series of parameters, which may contain the endpoints of a line or polygon, or its color, or the start and end locations of a block of memory to be relocated. This latter process is referred to as a "blit," or "block transfer." The newer editions of the ST (now simply called "Megas") have encoded Line-A routines on a special custom chip, which is the famous "blitter" chip you may have read about. The Amiga has always had its "bimmer" contained within its "Agnus" graphics chip, so having a blitter has always been the elusive dream of the ST's designers. Now a Line-A opcode can trigger the engagement of an entire chip; and it was this selective engagement which caused the blitter's prototypes to literally fry in their sockets in Atari's labs for nearly two years.

Another elusive dream at Atari has been the memory-conservative usage of multiple fonts and screen icons. When GEM was first ported to the ST from the PC, the portion of GEM which controlled graphics primitives— called Graphic Device Operating System—was based exclusively on PC architecture. Consider GDOS the extreme right-wing minority of the ST parliament, either showing up to stage filibusters and take up space and time, or not showing up at all. Atari was forced to write a substitute 68000 GDOS from byte one; and although each new software- based version of GDOS is better and faster than the last, it still doesn't provide an optimum solution, especially for the amateur user who will be confused by its very-old- style bootstrap installation procedure.

GEM itself was "trained" to recognize fonts (styles of letters) in terms of scales and sizes, but it cannot internally rescale a font to a larger or smaller size like the Macintosh. In GEM, if you want a smaller font, you want a different font. Each font of each size to be used in a particular session must reside totally in memory; so the free RAM in a one-megabyte 1040 ST could be consumed by all the fonts in a four-page newsletter. The solution to this dilemma, say third-party developers, lay in the creation of a substitute GDOS that utilizes only Line-A.

Where From Here?

The current trend in computer development is toward multi-tasking, multi-user, multi-terminal environments. One may rightfully ask, will UNIX be too much of an OS for a single user? Or in order for people to be able to use tomorrow's computers, will they have to bunch themselves together to become "multi-users?"

The Atari ST works, and works well. In the future, there will be some users who will only need a word processing system, or a small SQL database, or a tool for artistic digression. For those purposes, the ST doesn't really need to be developed much more than it already is. There may be a future awaiting us in which all computers are virtually connected to each other in a global Open Systems Interconnection network; in which case, Atari will have to prepare itself. More people will need to know that there still is an Atari. Until then, this writer intends to type all his articles on an Atari ST, since nothing that's currently under development by anyone—no matter how magnanimous or grandiose it may be—seems to have the ST's capacity to interact with the user on his level. ●

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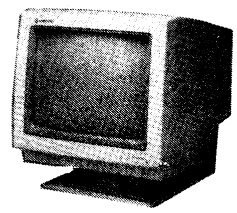

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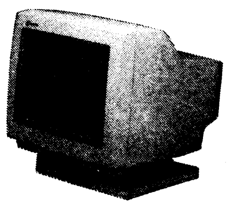

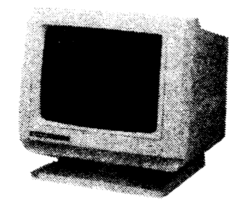

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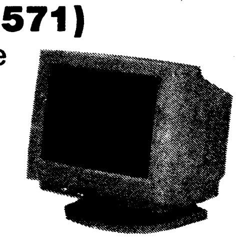

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ST Game Pick Of The Month

Reviewed by D.F. Scott

It's morning—which is not that interesting a fact in and of itself because for the past 36 hours it has consistently been morning. An invisible sun illuminates an impossibly cloudless blue sky, over a sea that's as blue as Ray Charles and as flat as Ethel Merman. Before you lay several dozen carelessly-sprinkled, perfectly rectangular islands which would take an electron microscope to locate on a wall-sized world map. All in all, it's a landscape conceived perhaps not by the hand of God but, more likely, McDonald's—everything being so flat, boxed up, and uneventfully convenient.

You're alone and rather comfortable inside the one material possession you own that Adman Kashoogi never thought to purchase: an aircraft carrier. It's a fairly small naval vessel; after all, your wife told you, a man doesn't really need an excessively large aircraft carrier just to get around in the world, just as long as it has on board the basic necessities. Looking around you, it's apparent that you have plenty of those: eight fully-armed aircraft, AM/FM stereo, eight amphibious land/sea rover vehicles, about a dozen cruise missiles, sun roof, fully-rotatable overhead laser turret, electronic fuel injection, air conditioning, infrared missile-attracting drones, side mirrors, camera-armed reconnaissance missiles, and velour seats.

Out there in the abyss, styrofoam islands are being swallowed by the enemy (known hereafter as "the enemy") like croutons swimming in vichyssoise. The enemy carrier, with defense craft swarming around it like flies to a skunk, is systematically planting the seeds of totalitarianism and monopoly throughout the dotted seascape, establishing a network of factories, oil drilling rigs, and defense stations more tangled than Reagan's brain at Recjavik. The job ahead of you is the strangulation of his supply lines, the disembodiment of his expansionist tactics, thus making this mini-Micronesia safe once again for men, women, and tourism.

The game is Carrier Command, and the publisher is Rainbird Software of the UK (yes, Rainbird again. It's not my fault if Rainbird/Firebird has yet to publish a bad game). Carrier Command is the best strategic/tactical game for the ST since Mindscape's High Roller (now renamed Harrier Combat Simulator), and is by far more involving than any of the current submarine games on the market.

The objective of the game is to eliminate any sign or remnant of the enemy's presence. You must squelch every enemy supply line, annex every enemy island, and destroy the enemy base. It is not a feat which can be accomplished in one day—or even in one week. Whatever islands you take over, your computerized opponent can take right back. As each island becomes more and more the victim of a tug-of-war between you and the computer, it becomes less and less capable of defending itself against its enemy. The more devastated by war an island becomes, the less useful it is to anyone. The more developed (i.e., left alone) an island is, the more time you have to capture new ones.

The tools of your trade are limited; which is why you must maintain links—supply lines—between each of your islands, which may be "pinched" at any point to form a stockpile or resupply stop. As long as your islands are linked to each other in a network, they can produce replacement ammunition, fighter vessels, and fuel. These supplies will automatically transport themselves to whichever island you designate as the stockpile. It is of strategic importance that you relocate the stockpile often during the game; if your opponent captures it, he can use the weapons you built against you.

Each side starts out with one island command center apiece, stationed on

continued on page 369

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Fourth Edition of TOS

continued from page 214

directory "AUTO" will not run automatically from a cold boot. Previously, only TOS-designated programs containing no GEM function calls could boot from an AUTO folder.

A "Quit" radio button has been added to the "NAME CONFLICT DURING COPY" dialog box, allowing the user to halt an entire batch file transfer.

A new GEMDOS function, frename, can rename a sub-directory. Previously, sub-directory names were fixed and immutable. As a result, the user can rename a folder on the GEM Desktop by poking it once with the mouse pointer, selecting "Show Info" from the "File" drop-down menu, and typing over its name in the dialog box that follows.

There is now no limit to the number of files that can inhabit a directory. One hundred was the prior limit.

The code for displaying the contents of a file on the screen or printer is being rewritten. The reasons for this are unknown.

The restriction of the size of the memory buffer used for disk copies on a single-drive systems has been lifted. All available memory will now be used, reducing the number of disk swaps necessary to perform a disk copy on the same drive.

When the ST recovers from an application crash, it will set the AES' wind_update function (#107) to "false," meaning that any updates to a window have been halted. This way, the Desktop doesn't mistakenly believe a window operation is in progress, and the keyboard will lock up less often.

Date specifications within TOS are now uniform, all using "/" as delimiters instead of some using " – ."

The Ctrl-Alt-Del key sequence will cause a warm reboot of the computer, as it does on its PC counterparts. Furthermore, the Ctrl-Alt-Right Shift-Del sequence will cause a cold boot of the computer, wiping memory clean before restarting.

The methods for detection for a change of disks in BIOS called #9, mediach, will be improved. Previously, there were some models of Atari disk drives which did not properly tell the system whether a disk was swapped for another. Because of this, the system would retain the older directory in memory and, after a file transfer, write that older directory to the newer disk, rendering files on that disk inaccessible. Apparently this trouble will be eliminated.

The code for searching the File Allocation Table has been rewritten, and is reportedly much faster.

A user-defined dialog box may now contain non-editable text to the right of an editable field.

The GEMDOS functions for setting the date and time ($2B and $2D, respectively) and the XBIOS function for setting the date and time (settime, #22) now set the same date and same time in the same way.

Calling XBIOS function #15 in this manner—rsconf (– 2, – 1, – 1, – 1, – 1, – 1)—returns the last RS-232 baud rate set by that function.

Finally, the world-famous 40-folder limit to a disk directory has been absolutely, positively destroyed.

In a conference interview over the Delphi telecom network conducted by Andy Eddy of the Atari ST Group, Atari Product Marketing Director Neil Harris stated the ROM sets for the third, older version of TOS "are being viewed by the engineering department as an interim set." The third edition was designed primarily for the Mega computers, and was the first edition to support the blitter block-memory movement chip. TOS 3 has received extensive criticism for appearing to have more internal bugs than TOS 2. Harris projected TOS 4—hopefully a more praiseworthy successor—would be released "late this year, (and) will be made available to end users along with the fabled blitter chips, which should be in better supply at that time."

"Personally, I had hoped to make the Mega ROMs available," Harris continued, "but a command decision was made not to do this because users would be unhappy buying ROM revisions too frequently. And in fact, there are major changes going into the next ROM set, much more than went into the Mega ROMs."

Since that conference, Harris has been beta-testing the new ROM sets himself, and reports them to be "pretty clean, and the improvements are enough to make me keep it" on his personal ST.

Harris also confirmed that the Corp. is considering replacing its current version of GDOS (Graphic Device Operating System) with a version being developed by independent programmers in Germany. He underscored the term "considering," emphasizing "this is not the forum for a product announcement."

The prototypes of the fourth edition of TOS will soon be undergoing beta testing by independent researchers; however, Roy Good emphasized, many other unannounced system enhancements will be kept under wraps until the final release, when it can be assured those enhancements actually work. In other words, TOS programmers officially have their carefully-wrapped Christmas present under construction.

Late Developments

Last month, we reported Charles Babbitt was hired as the first President of Atari's new computer division. This month, just before our August deadline, Babbitt was fired, along with many of Babbitt's associates including computer division Vice President Anthony Gould. August J. Ligouri, an Atari vice president for Computer Operations earlier this year, has been appointed interim president of Atari Computer. ●

ST Game

continued from page 368

opposite corners of the square playing field. On the map, the unclaimed islands are green, your islands are blue, and the bad guy wears red—it's an RGB world out there. The game's opening menu offers an "action" version in which many islands start out predeveloped, and the battle begins with your carrier stationed at the crucial enemy defense base Thermopylae. At the beginning of the "strategy" version, the world is mostly green and unexplored, and your only available resources are on board your carrier.

Your opponent does have this one advantage over you during most of the game: it's carrier is much faster than yours. In the time it takes you to annex one island in a hurry, it can annex three. You can't see the other carrier on the map, but your radio/telegraph will buzz you whenever an island falls victim to the Wrath of the Black Brick (which is all I'll tell you about the enemy's appearance).

To take over an uninhabited island, you send one of your "Walrus" Amphibious Assault Vehicles across its beach, defoliate some trees transplanted from The Sentry (green umbrellas on stilts), and drop a small pod onto the island. This pod unfolds like origami into an island command center, complete with tools, supplies, and even little purple and yellow robots with birds' legs and missile launchers. The command center will then automatically refurbish and redecorate your island to suit your needs.

When an island command center is destroyed—yours as well as your opponent's—everything built or collected on that island is lost. The spoils of war will instantly decompose like flash paper. To capture an island whole and intact, along with its oil wells or factories or fortresses, Carrier Command offers you one of the miracles of psychological warfare: the virus bomb. Looking like a cross between a soccer ball and an Amiga commercial, a Walrus can launch a virus bomb at the garage door (yes, you read right) of the enemy command center. Once it hits successfully, life on the island will proceed as usual, but with all the inhabitants now working on your behalf, and all its resources at your disposal.

Your carrier bears a laser turret

continued on page 372

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TI Forum

continued from page 241

word; it is about the process of modem communications, not computers themselves), I think it will be useful to anyone who is interested in getting started with a modem. I am quite proud of it. It is available from me for $10. Satisfaction guaranteed or your money back. To order send check or money order or write for a descriptive flyer to Ron Albright, P.O. Box 12288, Columbus, GA 31907. I hope you like it. End of commercial.

From JZ's Desk
PBBS Debuts For 99/4A

The Paradigm bulletin board system (PBBS), under development for over two years by TI notables Mike Kimble and Travis Watford, is now available as "fairware" for the TI-99/4A. The board offers some impressive features for both Sysop and user.

The program is actually an almost complete overhaul and rewriting of Scott Darling's (systems operator of GEnie's TI Roundtable) TIK bulletin board program. Kimble wrote the Extended BASIC portions, with Watford developing the assembly routines.

The extra features of the board are many. Users may select any line length to which all text will be automatically word wrapped. The program scans for interrupt characters after every character that it sends, allowing for instantaneous recognition of commands to halt or pause output.

On the Sysop end, there are two screens which may be toggled back and forth: a 40-column duplicate of the ongoing session, and a 28-column informational screen for the Sysop. The Sysop's keyboard can also act exactly like the user's, allowing for the "walking" of new users through the board.

The board requires only a special cable on top of the normal TI telecommunications setup to operate properly (a RAMdisk is especially helpful for fast operation, though). The cable, in conjunction with an assembly routine adjusting and reading the DTR pin, allows the board to immediately disconnect users and also immediately detect hangups without the use of clumsy modem command strings.

Log-in bulletins are keyed to the user's last log-in date, and will not redisplay after the user has viewed them past the posting date.

If the board's present state is not impressive enough, it's planned future certainly is. Watford is completing new assembly routines that may find application outside of PBBS, while Kimble is scrambling to rewrite the board to utilize them.

One routine, which will probably be marketed commercially as a separate package, greatly reduces loading and

continued on page 373

ST Game

continued from page 369

which rotates 360 degrees around it and 90 degrees above it, so it can double as ship's forward cannons and anti-aircraft guns. It also has a killer cruise missile launcher at its stern, with missiles that locate their targets through the aid of a camera attached to a rocket you can launch overhead.

The "look-and-feel" of Carrier Command, although original, somewhat resembles commanding the invasion of Grenada from a remote Casio pocket calculator. Commands are entered by pressing simulated gold plastic keys with the mouse pointer. Your main viewer displays one of the best-orchestrated three-dimensional perspectives in computer games. Your carrier has cameras all over it: at the bridge looking ahead, atop the laser turret looking in any direction, at the bow looking back, at the stern also looking back, at the starboard toward the plane launching pad, and at the port toward the hangar bay at stern. Whenever you launch a plane or amphibian, or whenever one returns home, the starboard and port cameras follow its movement, adding a graceful as well as dramatic touch to a game whose sound effects—full of static and "ping" noises—are no embellishment.

Your vessel, from a plane or amphibian looking back, looks less like an aircraft carrier than it does Jacques Cousteau's Calypso; more than once while orbiting it, I swore I could hear Rod Serling narration in the distance. Although the islands have a tendency to look like Bruce Artwick's childhood playroom, the scenery does give the game enough of a feeling of vastness that it doesn't feel like playing on a checkerboard. Surreal though it may be, there's just enough scenery in this game to suggest the presence of a world.

People who just like to watch games being played may find Carrier Command at times to be a real drag. During those times when the carrier is headed on autopilot to a far-off island, it doesn't appear to the observer that anything is really happening. Even the player may find herself suffering from the symptoms of D.F. Screen-flipping Syndrome: madly poking buttons, switching camera-views repeatedly, resetting the planes' autopilot trajectory by a fourth of a degree, during the "lull" periods of the game where relatively nothing's happening.

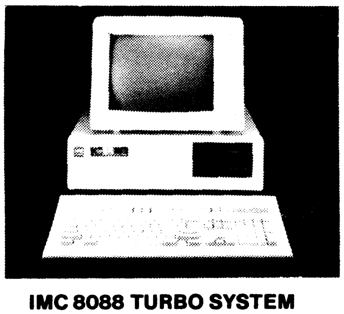
These lull periods are important to the strategic realism of the game. Unlike a "shoot-'em-up" like Starglider in which the level of outside threat adapts itself continually to your increasing skill level, Carrier Command makes effective use of dead silence, for a dramatic effect that movie directors call "build up." There's plenty of build up when the enemy carrier is miles away from you, and especially when your stockpile transfer ships haven't arrived at the designated island. Lulls provide a necessary contrast to those periods of high activity when the maps and radar screens resemble Chicago O'Hare Airport on a Friday afternoon, and there are more projectiles in the air than were ever stockpiled on Grenada.

For those of you who aren't that fond of dead silence, Carrier Command makes a historic breakthrough: It is the first computer game with its own Dolby stereo soundtrack. I'm no music critic, so I won't pass judgement on the theme song; but those of you who prefer a playing environment more akin to the movie *Top Gun* will welcome this free cassette tape—as well as the opportunity to turn the tape over during the game's lull periods. You get the game, the tape, the Carrier Command window sticker, and a subscription form for *Computer Shopper* (no kidding!) all for the incredible low price mentioned at the end of this article.

Carrier Command can be won without ever confronting the enemy carrier face-to-face. If you can exhaust it by developing defense islands at strategic locations, and by leading it into traps where you can cut off his supply routes, the Black Brick of the Flat Blue Seas can be stopped dead in its tracks. Until you (read: I) ever grow adept enough to achieve such a feat, the Brick will have a tendency to follow behind you, taking over the islands you just conquered. The Brick may have the best defenses since the Scopes monkey trial; yet it is extremely shy, and will probably never venture to an island where your carrier is located. It actually overestimates your capability to defeat it.

Be forewarned: Carrier Command is a frustrating, aggravating game, and is recommended only for those who enjoy or require frustration and aggravation in their lives. Players should be happily-married if at all, should not be air traffic controllers, and at movie-watching parties bring copies of such favorites as *Midway, Tora! Tora! Tora!*, and *Thirty Seconds Over Tokyo*. Carrier Command is for the strategic/tactical game player what DungeonMaster is for the adventurer gamer—not an escape from real dangers but an indulgence in new ones.

Carrier Command, created by Clare Edgeley, Ricardo Pinto, Ian Oliver, Graeme Baird, et al., may be obtained from Realtime Games Software Limited, for Rainbird Software, 74 New Oxford St., London WC1A 1PS UK. The price is $39.95. ●



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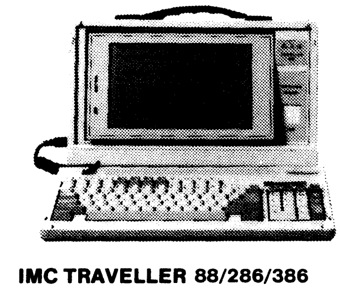

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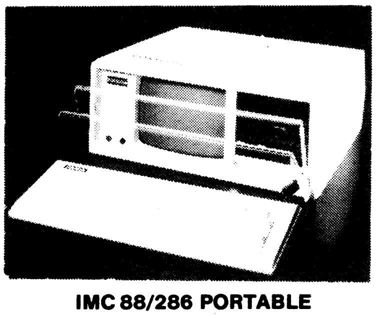

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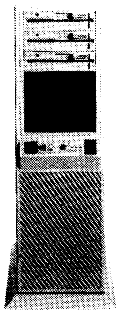

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New Software For The 8-Bit Atari

Reviewed by John Nagy

As the "BIG" software companies continue their move out of 8-bit computer support, imports, small companies and "basement operations" are taking over, often with innovative and very low price offerings. Three recent releases for the Atari 8-bit line continue this trend: a new Disk Operating System, "SuperDOS"; an operating environment, "M.T.O.S."; and a machine-language users utility, "Programmer's Pal."

SuperDOS

SuperDOS is an Austrailian import, written by Paul Nicholls. U.S. distribution is by Technical Support, 205 Peoria Street, Daly City, CA 94014. The price is $20 plus $1 shipping. As a marketing tool, many Atari user groups have been offered "distribution rights" by which they may also charge $20, keep $5 for their effort, and send the balance to Technical Support along with a registered user list. Being registered gets you on a "future upgrade list."

Unlike some "DOS" replacements, SuperDOS does not use the DOS kernel from Atari DOS 2.0 or 2.5. SuperDOS does have the same DOS.SYS and DUP.SYS structure, but it is all new code. Also included is an AUX.SYS file for the seldom used features, and menu utilities for running BASIC or BINARY programs.

So what makes this DOS anything you would want? Plenty. First, it supports all three "normal" Atari disk densities, with automatic sensing and reconfiguring. It sets up its own RAMdisk, checking first to see if it should be any configuration up to 320K—even Axlon RAMdisks for use on 800s! That's a new one.

It will automatically copy any file with a .RAM extender into its RAMdisk at bootup, and will switch to RAMdisk for any input/output if Drive #1 goes offline. That means you can copy files to RAM (which will be called by anything from D5: to D8:), shut off your D1: and the program will run from RAMdisk with no device number errors. Neat.

It'll trace and restore deleted files, as well as attempt to patch damaged sector files. You can use lowercase, inverse, and numbers in the filenames. Its Binary Save will even save a cartridge to disk. It will copy to and from cassettes. A true sector copy feature skips empty sectors. DOS 3.0 (ARG!) is even supported for conversion to DOS 2.x format using one or two drives. Set your key repeat rate, verify, buffers, etc. from the menu without pokes. XIO support has been added for access to the higher functions of SuperDOS from BASIC or ML programs, all with good documentation.

All this plus those things we have gotten used to on the up-scale DOSs, like single keypress menus, resident DUP.SYS, menu-top indicators of drive densities, double column file directories, high-speed and skew I/O support for the U.S. Doubler and SuperMax, and a lot more. All this with a memlo Below DOS 2.x!

So how is it to use? It feels a lot like DOS 2.x or SmartDOS, using a menu. The screen keeps changing colors according to the process underway (which is at once a good warning and very distracting). Most operations are nicely prompted, with only a few too many "are you sure" messages. But if you don't want to see them, most options can suppress the verification prompt by adding /N to your filespec. Similar nice touches include the good sense to cause only a single filename to be changed when trying to undo that familiar curse of accidental duplicate filenames.

So, is there anything bad about SuperDOS? Not exactly. At $20, it is a good buy, but performs short of the Rolls Royce of DOS's, SpartaDOS (by ICD/OSS Corp). What do you lose (compared to SpartaDOS)? Subdirectories. Double sided disk support (XF551, anyone?) Time/Date stamping of files. Hard drive support. Plus, many unique utilities are made exclusively for SpartaDOS.

But SpartaDOS is quite a different animal, and at $39.95, is more than

continued on page 468

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New Software

continued from page 467

some people need. Many users, if not most, will not need the advanced SpartaDOS features. SpartaDOS is also significantly harder to learn to use, and many casual users never master it. Nor will some want to use a different DOS version in their 800 than they use in their XE (as SpartaDOS requires).

All in all, SuperDOS is a super product, maybe the best "DOS 2 type" DOS available (MYDOS users will have a fit when they read that!) At $20, it is a perfect upgrade for an intermediate computer user who doesn't need or want to learn to use SpartaDOS. And, since SuperDOS version 4.4 is dated February 1988, it is likely to still be in active development. Registered owners might soon be offered an upgrade for use with theXF551 double sided drive, the current lack of which is the only shortcoming I view as serious.

To get SuperDOS, contact your local Atari support group, or write to Technical Support at the address given.

M.T.O.S.—Multi-Tasking Operating System

Written by Tom Hunt (who brought you the public domain The Works and now The Works-XE page designer programs), M.T.O.S. was discussed a few months back in my column. At that time, it was an experimental free distribution demo. A new demo has been distributed, along with sales information about the "new" current M.T.O.S., being distributed for $15 through Dataque, 3308 Park Avenue West, P.O. Box 134, Ontario, Ohio 44862.

Simply stated, M.T.O.S. allows specially written programs to reside simultaneously in your 8-bit Atari, each doing their own work as the CPU is switched among them. Ultimately, this would allow many more options in the use of the computer, since some tasks could be running "background." Like a terminal program, downloading a big file while you word process or play a game. Or on a BBS, a user could be reading messages in one base while a Sysop edits a message in another. Or, internal print-spooling could release your computer for other useful work while the printer churns out a long document. As with any computer project, the possibilities are endless if you have the right tools.

M.T.O.S. is growing into one of those tools. But don't expect to buy M.T.O.S. and "run it." M.T.O.S. is more like a DOS or developer's package, it only exists to let you run other programs—and only a few example programs are included. You are expected to write your own, using the information in the complete but convoluted documentation.

Features at this point include the ability to run up to four tasks (programs) on a 128K machine, up to six in 256K. Both BASIC and BINARY programs can be running at the same time. Your screen and keyboard can be switched ("attached") to any one job at a time, while all run. Inter-task messaging (like output from your word processor into your printer handler) is available. Task skipping and task priority are controllable, and re-prioritizable. All DOSs are usable, and SpartaDOS users will have some access to batching and command line processes within each task.

Sounds great? It is quite an accomplishment, but not without costs. The actual CPU of the computer can only do one task at a time, so M.T.O.S. "slices" time and has the CPU do each task for a few clock cycles, then moves to the next task. What results is slow performance on CPU intensive programs, and on our machines, and that's most of them! The delay between a keypress and the "take"can be distractingly long if the program application is not set up to accommodate the process. Worse, the M.T.O.S. kernal itself must use CPU time to do the switching. So, you have less time left for each task.

Still, the potential for new programs designed as modules for mix-and-match under M.T.O.S. is exciting—they are just not here yet. M.T.O.S. should be seen as an experimental new operating environment, not as a product in itself. Further development may include a new CPU, perhaps the 65C802, to speed up the Atari and make each task fly.

In any case, if you are still interested in getting M.T.O.S. after hearing all this, you are just the person Tom Hunt wants to have playing with his baby. At $15, look at the price as a developer's registration. Tom will be happy to have capable people working and communicating about M.T.O.S. If you aren't a programmer, you have been warned. You would be better off waiting a while, and paying more for some finished applications of M.T.O.S. I believe that there will be some doosies.

Programmer's Pal

"The programmer's Pal was originally derived from the concept that every time you needed a computer—the thing you needed it for—ended up being the computer..." So begins the documentation for the resident utility Programmer's Pal. By Chuck Steinman, Pal is $20, also marketed through Dataque (see address previously listed in M.T.O.S. review).

The idea behind Pal is that a number of tables and calculations should be available to the programmer at all times, even though he is in the middle of doing something else on the computer. IBM and other larger computers can do this with various resident utilities, but our Atari 8-bit is just too busy already. Some DOSs and BASICs provide some parameter support, but Pal attempts to go further—with mixed success.

The Pal installs as an AUTORUN.SYS file at boot time. It has six functions, each with its own screen.

Press Control/4, and the Translation Table appears—showing a scrolling table showing equivalents in Decimal, Hex, ATASCII Character, internal key character, and the 6502 mnemonic for machine language programming. (For each function, control/0 (zero) gets you back to wherever you were in whatever you were doing.)

Control/5 brings up a screen showing the current Basic Pointers, including

continued on page 469

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Note And Point—Atari 8-Bit News And Comment

by John Nagy

Comdex and CES—both have been exciting trade shows for Atari fans for many years. This year was, well, clearly not for 8-bit Atari fans. Lots of new productivity and entertainment software was shown for ST, but only a smattering of Game-Only software for the 8-bit.

The Spring Comdex is the business oriented Computer Dealers Exposition, held in May in Atlanta. No new Atari hardware was shown—by Atari anyway, although some hot ST products were shown by third-party developers. Nothing for the 8-bit.

Spring's Consumer Electronics Show (CES) in Chicago in June showed outstanding game machine support, with walls of 2600, 7800, and XE Game Systems. Lots of games—and only a couple of ST machines in the whole booth complex. But the Atari focus outside the Atari exhibit at third party developers was really ST, ST, and more ST. No apologies or sneers this year, either. Although the Amiga was perhaps shown at more booths, everybody has new games for the ST. And some, even for the XE Game System (now that 8-bits aren't computers anymore!).

Atari Corp. is, if you haven't heard, now split into two: the Atari Entertainment Electronics Division, with Michael Katz as president (this is where any residual 8-bit support will lie, as well as gaming support for the ST); and the Atari Computer Division with President Chuck Babbitt (here's where the business and productivity stuff will be). The entertainment division is plan-

continued on page 470

New Software

continued from page 468

values for RUNSTAK, MEMLO, MEMHI, VNTP, STARP, and more.

Control/6 gives you a "16 bit calculator" with logical functions. That means, 2 16 bit operators can be selected for simultaneous display of their products when added, subtracted, multiplied, divided, ANDed, ORed, XORed, all in decimal and HEX.

Control/7 lets you examine any one sector selected from the disk in drive one.

Control/8 will allow you to scroll up or down through the memory of the entire computer, PEEKing at the address, value at the address, and a dissassembly at that address.

Control/9 gives the hardware register equates, again displayed in Hex and Decimal.

Remember that all this is resident behind whatever you happen to be doing at the time. Sounds pretty good, eh? Well, there are some limits. For example, the sector display? Sorry, single density only. And the means of entering operators in the calculator? Use the arrow keys and the console keys to slide up or down through a sequential list. (Remember, this is resident behind a program! Keypresses are apparently not capable of being taken.) Oh, and you have to be using BASIC. And when you go to DOS for anything, although Pal will work there just as well as out in BASIC, you must return to BASIC by jumping to address $A000, because the (B) Run Cartridge will erase the Pal. And you can't use any application—or DOS—that uses the RAM under the BASIC ROM.

What? Yes, Pal gives you a lot of good information for use in machine language programming—but only if you are using BASIC at the time. And not if you are using the most powerful DOS available for program development—SpartaDOS (which uses the same area that Pal lives). And only if you jump through some additional (admittedly trivial but annoying) hoops.

Still, Programmer's Pal sounds like it would answer a problem you are having, it is flashy and seemingly reliable. I know the resident screens impressed a few visitors in my computer room while I tested it. It's a neat piece of work, no doubt, but now that I know what I have to give up to use it, I'm not likely to load Programmer's Pal again.

Chuck Steinman should figure out something else to use his slick resident screen-swap idea. A couple of charts lying next to the computer would do almost as well, without limitations. ●

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Note And Point

continued from page 469

ning to spend large amounts of money nationwide on advertising their video game systems—while the computer side has said that they will spend all of their TV money on targeted cable ads.

Meanwhile at the stock exchange—Atari has maintained a $7 to $8 plus price for several months of very active trading—active enough to make the top-five list in the American Exchange quite frequently lately. Earnings and profits were announced for '87-'88, and they are remarkably similar to the previous year, if you don't look at losses in the Federated department store chain, bought by Atari last year. Actually, that means things are pretty good, since the previous year's figures were inflated through a change in accounting procedures—and since Federated hopes to be showing profits by this fall.

By the way, Federated is not the same Federated that was being bought out by Macy's of New York—that was an unrelated "Federated Department Stores," whereas Atari owns "The Federated Group." Lots of club publications were speculating on this one, but its a different company altogether.

Atari does intend to make their West-coast-only Federated Electronics stores into "real" computer outlets, with competent staff and support, not a "cut-rate" operation. And more than just Ataris will be sold in them. Meanwhile, the mail-order folks are definitely getting the axe for computer distribution (so where will the rest of us find them?).

Hard to believe, but true: Spinnaker's Newsroom program for the Atari 8-bit, so long asked for and awaited, won't work using a real 850 Atari printer interface! It will work using almost anything else—and the company has assured us that they will try to find a solution "as soon as they can get an 850 from somewhere to test it." Yikes. Buyers can get a refund if they can't wait. Other reasons to consider other newspaper-layout programs include Newsroom's inability to import graphics or text from any other source.

Congratulations to Ron Kovacs who has produced *ZMagazine*, a weekly electronic Atari newsletter for BBS distribution for two years now. Often the content of *ZMag* has bristled the hair on Atari and other corporate groups, but the consistency and professionalism Ron has upheld (at his own non-profit expense!) has paid off. CompuServe, at one time at serious odds with Ron over the inclusion of information about other telecom service vendors, has finally even made a special Download Library just for *ZMag*. The same has now happened on Delphi, and GEnie even has a special MESSAGE/SIG area in the Atari Roundtable for Ron and his fine product. *ZMag-ST* (now edited by others but under Ron's guidance) joined the ranks with the original *ZMag* (which now focuses on 8-bit news), and year #3 looks bright. Keep it up, Ron!

Speaking of GEnie, where Atari is big stuff, our own *Computer Shopper* has its own SIG there now. Move to *Computer Shopper* to look around. I hope we can make arrangements to post any Atari public domain programs discussed here in my columns available in *Computer Shopper* SIG, even if they are duplicated in the Atari SIG. This would make them more accessible and easier to find for our readers. Maybe post them for a couple months and then clear them out? Jeff Brenner (Applying The Atari) may be also interested in posting some of his items there. Stay tuned.

Public Domain Releases

I can't begin to tell you about all the goodies that are newly available for our 8-bit Ataris, but several are particularly exciting right now.

AlfCrunch—Not a way to smash furry aliens, this is finally a better file compactor than ARC (Archive). For about a year, ARC (programmed for the 8-bit Atari by Ralph Walden) has been the protocol of choice for "making little ones out of big ones," because it would:

1) (Fairly) reliably take multiple files of your choice and make them all into one file for later extraction, with filenames as in the original.

2) Save as much as 50% in total file size over the originals.

3) Use the same format as the IBM and ST Archive, allowing interchange between machines.

The reduced size and recovery of the original filenames is very important to users of modems to transfer files, and also has application for backing up your important files in a minimum of disk space. The down side of ARC has been occasional "CRC CHECKSUM" errors making the output files not match the input, a buggy user interface on the 8-bit ARC and UN-ARC programs that can cause lots of lost time and effort, and the slow performance of ARC on our 8-bit Atari.

AlfCrunch, by Alfred of the Programmer's Aid BBS (416) 465-4182, provides a remarkable alternative to ARC. I don't know how it works—but it works great! Distributed on most of the telecom services and BBSs by now, get it quick. Alfred, whoever he is, doesn't even call this work "Shareware" or ask for donations—although few have been more deserving.

When I first tested AlfCrunch to compact a list of files, I was certain that it had errored out or was somehow "faking it," since it was done in 30 seconds! The same list later took almost 4 minutes to ARC. It was even faster Un-Alfing (?) the compacted file—only about 20 seconds! De-ARCing its mate took over 3 minutes. And the bottom line: ARC saved 26% compared to the total of the original file sizes, while AlfCrunch saved 45%! Yikes! AlfCrunch is actually faster than the ARC used on an IBM or ST! (How long before Alfred makes a version for the other machines?)

I could not coax AlfCrunch into making any errors of its own—and the documentation that comes with it is very thorough. It will pass parameters on the SPARTADOS command line, or run in a full prompt mode on any DOS, even with BASIC enabled. Amazing.

The output file from AlfCrunch (Version 1.2 and higher) can also be viewed with any of the many ARC-VIEW pro-

continued on page 471

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Note And Point

continued from page 470

grams floating around on the BBS circuit, allowing the file contents and restored sizes to be examined without processing the file to a disk. Although the main reason for the popularity of VIEWERS was that ARC took so long to run, AlfCrunch users will still appreciate the ability to peek into their stored files.

So, AlfCrunch solves all of the problems of ARC except the compatibility with other type computers. As a result, I can only see two cases that would make you choose to use any other compaction method: 1) When you know your file must be later read by machines other than your 8-bit Atari, continue to use ARC; 2) When you must transfer a boot disk or a DOS, use DISKCOM. (DISKCOM by Robert Puff, now in Version 3.2 or higher, is very friendly, fast, and reliable, but does nothing to reduce the overall size of the files. What it excels at is making a file which can later by restored to be identical (byte for byte, sector for sector) to the original disk. Scrunch was once a popular format for this same purpose, but Robert's rapid-fire improvements to DISKCOM, plus its ability to make double and enhanced-density (Ick!) disks have made it the clear program of choice.)

DETERM—A new terminal to compete in the Express! dominated telecommunications market. This one, by Jim Dillow, offers a few interesting features—the most notable one, a built-in Breakout game, playable even while online or downloading files!

So far, only a Beta version for testing is available, and only on CompuServe. The author has asked that the program not be distributed via BBSs, at least for now. I don't know why—other than such a request typically results in lightning-like distribution. It is shareware, and satisfied users are asked to send money, ideas, and critiques.

At this point, R: driven modem systems (850 interface-type and maybe XM301/1030 modems) are supported. Also, MODEM.BAT files are supported for sending commands at bootup to your modem. Other functions are pretty conventional for a good terminal (macros, phone lists, etc.), plus there is support for easing some of the PC-Pursuit command entry confusion for subscribers to that service.

How is it? Well, after my initial playing with it, it moved to the back of my stack of disks. Although the program is generally capable, the menus are hard to get used to, and the overall feel is not as consistent as in Keith Ledbetter's Express!. Plus, the Xmodem is slower than any other term program I have used lately (although not much slower). The advantage of the game is debatable. Some users will love the diversion. I found it not especially smooth or enjoyable, but I never have been an arcade fanatic. Overall, DETERM is worth trying out and may get better in final release form. Til then, I recommend Express!, or AMODEM 7.5 or whatever it's up to now. (Next time I will have had a look at another program called PCPTERM that purports to make the use of PC Pursuit almost easy.)

Signmaker 1.3—Jeff Colehour impressed us with Signmaker, reviewed briefly in an earlier column. Version 1.3 goes further to debug and simplify the use of this shareware program. Basically an alternative to Printshop, Signmaker allows the use of any two Printshop format icons and any combination of any three normal Atari fonts in any of four sizes, all on the same page. Inverse and control graphic characters can also be used in the sign. Text can be imported from normal word processor files, and can be automatically centered. The biggest change in the new version is the View Sign feature. Although it must first save the sign data to a disk (and it takes a whole disk!), this lets you examine the final product before printing, as well as saving it for later use. If you save it to RAMdisk, the process is very fast, so viewing need not be a painfully long experience on an extended memory computer.

Although Signmaker can't touch Printshop for ease of use or polish, it offers some power to make signs that even Printshop can't do, like making full page printouts of graphics from ATASCII BBS cartoons. Check this one out.

PS Utilities 1.0—Rich Spencer has put several useful features into one package, written in Action!. It accomplishes the hard-to-live-without functions of Renaming, Copying, and Deleting Printshop format icons. It also allows conversion of MicroPainter (Koala/Touch Tablet) format files into icons (and back!). Although these features are available (one at a time) via the commercial Printshop Compan-

continued on page 472

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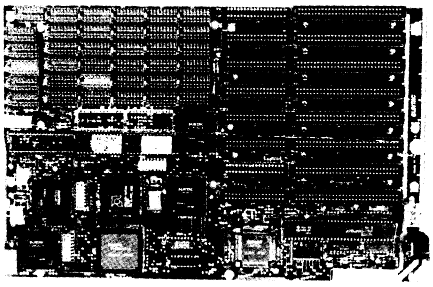

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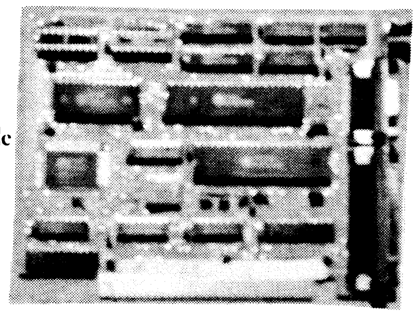

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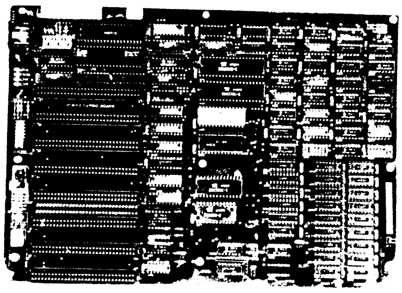

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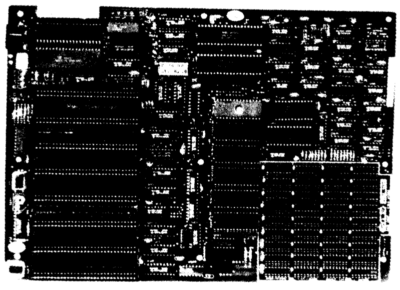

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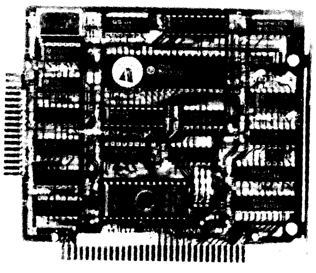

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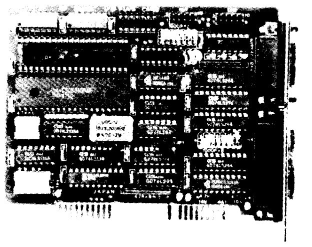

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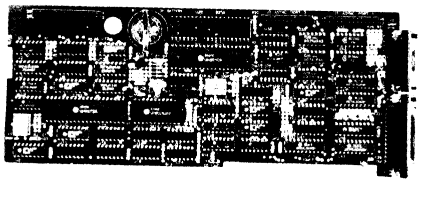

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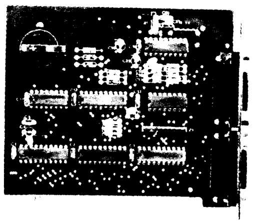

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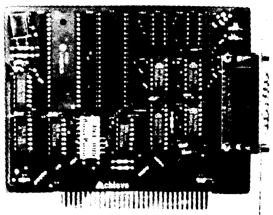

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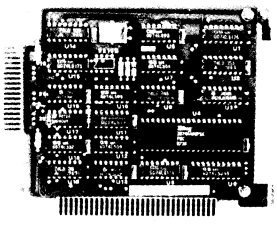

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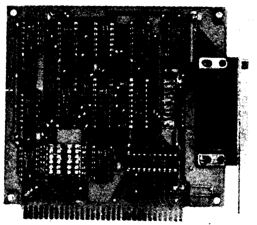

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The Z88 Personal Computer

SSI Computer Systems, Inc. has announced the Z88 computer—the first personal computer that fits inside a regular briefcase.

The Z88 measures only 11½ inches by 8¼ inches (almost exactly the same as a sheet of paper) and less than 7/8 inch thick. It weighs less than two pounds.

But the Z88 is no lightweight when it comes to computing power. It has a multi-tasking operating system, which allows the user to have several applications open at the same time, and to move quickly from one to another, without saving, exiting or loading, even after the computer has been turned off. This means that the user can begin work immediately, without waiting for the operating system, the applications and the files to be loaded.

Built-in applications include word processing, spreadsheet, database, communications, diary, calendar, calculator and alarms. The Z88's software features pop down menus, and on-line context-sensitive help.

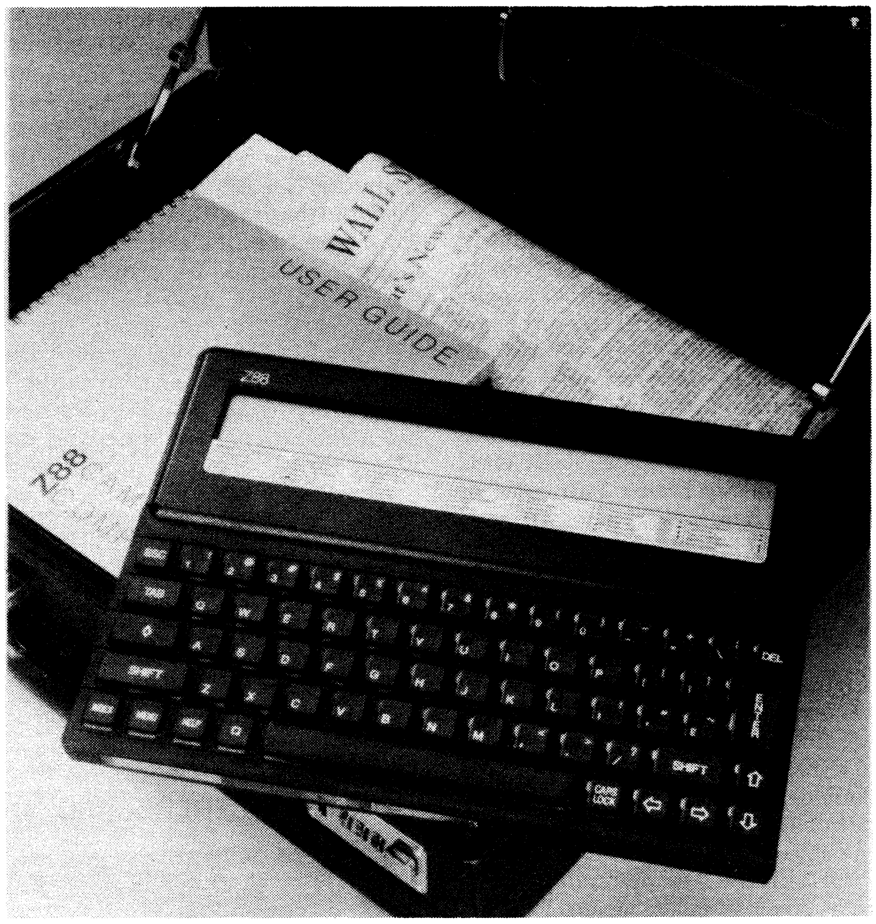
The Z88 can address more than three megabytes of internal memory.

Maurice Giguere, president of SSI Computer Systems, said, "The Z88 is not only the ultimate portable personal computer; it's also the perfect traveling companion for users of desktop PCs.

"Now, you can download WordStar and Lotus 1-2-3 files from your desktop computer and take your work with you wherever you go."

"Because of its size, its battery life (20 hours on 4 AAs) and its silent keyboard, the Z88 can be used anywhere—on a plane, in a meeting, at a seminar."

One reason for the Z88's compactness is that it doesn't need disk drives. The memory consists of three separate solid state memory modules, one of which can be an EPROM and removed like a diskette.



The Z88's supertwist LCD display has eight lines by 106 characters. This enables the Z88 to show a full eighty columns and a page map (a thumbnail image of the full page).

Ronald Giguere, Chairman of Diversified Foods, SSI Computer Systems' parent company, said, "The Z88 is aimed at everyone who wants true portability in computing, whether they also use a desktop computer or not.

"The emergence of laptop computers in the past year has shown that the demand exists for portability. But until now, the products offered have been compromises.

"With the availability of the Z88, we expect to see the market really take off. Within the next decade, the Z88 and computers like it will become as widespread as calculators."

The Z88 has a suggested retail price of $549, and will be available through major computer and retail stores. A full range of peripheral products—including memory modules, printer cables, and PC Link (for transferring files to and from PCs)—is also available.

The Z88 was designed for SSI Computer Systems, Inc., by a team led by Sir Clive Sinclair, who has created several innovative electronics products over the past twenty years; and is manufactured for SSI Computer Systems by SCI Corp., one of America's largest electronics manufacturers. It is already the best-selling portable computer in Britain.

For more information contact: SSI Computer Systems, Inc., 424 Cumberland Avenue, P.O. Box 4080, Portland, Maine 04101; (207)761-3700. ●

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continued from page 471

ion plus various other PD programs, this is a nice package for serious Printshop users. The good documentation ends with some very useful information about the innards of a Printshop disk, and asks for input for future versions.

POSDEMO—Hold on to your seat for an 800 + sector download of Xenia Research's Point of Sale demo. Get it on GEnie or other telecom services. Although it is a demo of a commercial product, this demo is worth its weight in RAM chips if you want to show off your 8-bit system. It requires that you DISKCOM the file onto a double density disk, and when it runs, it shows many functions of a store inventory, sales, receipt, ordering, and salesperson reporting system. Barcodes are printed and read, documents and reports stream out of the printer, the display shows finely designed "SYNFILE" looking screens for input and output. This system is expected to sell for well under $200 including the Barcode reader (!!) and can network several sales locations for interdependent operation. It should be available for sale by the time your read this. Best Electronics of San Jose, CA and Butlers Computers in Federal Way, WA will have supplies of POS NET. Yes, I'm very impressed. This large, detailed, self-running demo will live on-screen at any future computer shows, showing what the 8-bit Atari can do when not gobbling ghosts! ●